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ABSTRACT

During the last 3 decades secondary education has become universal in most industrialized countries. Sub-Saharan African countries face special challenges to benefit from this international trend. The gap between these countries and the rest of the world in coverage, quality, and relevance of secondary education is widening. To address these issues, the Africa region of the World Bank, in cooperation with African educators and institutions, launched the "Study on Secondary Education in Africa" (SEIA). The SEIA study is executed in two phases from 2002 to 2004. During the first phase data and reports are produced; the second phase disseminates results and conducts regional workshops to discuss ways to improve secondary education in Africa. This publication contains presentations made by World Bank staff and consultants during the December 2001 UNESCO/BREDA (United Nations Educational, Scientific, and Cultural Organization/Regional Bureau for Education in Africa)--World Bank Regional Workshop in Mauritius (Africa) on the "Renewal of African Secondary Education." Following a Foreword and Introduction, papers in the publication are: "Secondary Education in Africa (SEIA)" (J. Bregman; S. Stallmeister); "Education Policies and Reform in South Korea" (Gwang-Jo Kim); "Renewal of Secondary Education Curricula and Assessment in South Africa" (S. J. Howie); "Recent Reforms of Science, Mathematics and ICT Education in the Netherlands in Basic and Secondary Education" (M. Pieters); and "Effective Monitoring of the Quality of Education" (F. J. M. A. Rameckers). (BT)

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Secondary Education in Africa: Strategies for Renewal

World Bank presentations at the December 2001
UNESCO/BREDA-World Bank Regional
Workshop in Mauritius on the Renewal of
Secondary Education in Africa

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Secondary Education in Africa: Strategies for Renewal

World Bank presentations at the December 2001 UNESCO/BREDA-World Bank Regional Workshop in Mauritius on the Renewal of African Secondary Education

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Foreword

Over the last few decades, the importance of secondary education has changed radically. This holds true both for the opportunities this level of education offers to the individual student as well as the role it plays in the economic and social development of nations. Only forty years ago, secondary education was the privilege of the few, even in most European countries, and its role in economic development was mainly to train a limited number of primary school graduates to meet the manpower needs of the economy. Coverage of secondary education was especially low in Sub-Saharan Africa, where the enrollment ratio was only 3 percent in 1960, and 7 percent in 1970.

During the last three decades, secondary education has become practically universal in most industrialized countries. Good quality secondary education is now considered a prerequisite both for successful integration of young people into the modern economy and for the ability of countries to benefit from the ICT and knowledge revolution and to compete successfully in the new globalized, knowledge-based economy. Secondary education provides countries with critical higher level skills and knowledge for advanced learning and training of technicians, scientists, and entrepreneurs. It also plays a crucial role in the socialization of young people and in targeting at-risk youth, and is central to fostering positive social attitudes. Secondary education yields considerable private returns and provides opportunities to acquire attitudes, skills, and competencies unlikely to be developed during the primary grades. These skills enable young people to participate fully in society, take control of their lives, and continue learning.

Sub-Saharan African countries face special challenges in benefiting from this international trend, and the gap between these countries and the rest of the world in coverage, quality, and relevance of secondary education is increasing. As progress towards universal primary education resumes, parents and communities are demanding expanded opportunities for secondary education — first at the lower secondary level and later at the upper secondary level. The demand pressure comes from both the need to increase the present low coverage of secondary education (less than 30 percent) and from continued rapid growth in the population of school age (projected at about 25 percent over the next fifteen years, as compared to stagnation or decline in other world regions).

Governments find it difficult to respond to these pressures since public budgets are already severely constrained, and most countries' economies are at best showing modest growth and not generating the financing required. In considering their options, governments must make difficult trade-offs between the role of public financing in providing different levels (lower and upper secondary education), and types of secondary education (general, technical, vocational), as well as in ensuring equity in provision between different population groups (e.g., boys and girls, urban/rural).

To address these issues the Africa Region of the World Bank, in cooperation with African educators and institutions, has launched the "Study on Secondary Education in Africa" (SEIA). This study will include seven specific thematic studies, regional workshops, and strategic country studies. It will explore options for practical solutions and review best practices within the African context.

The SEIA study will be executed in two phases from 2002 to 2004. During the first phase data and reports will be produced; the second phase will disseminate results and conduct regional workshops to discuss ways to improve secondary education In Africa.

This paper contains presentations made by World Bank staff and consultants during the December 2001 UNESCO-World Bank Regional Workshop in Mauritius on the "Renewal of African Secondary Education." The Mauritius Minister of Education hosted this workshop and provided valuable inputs from the ongoing Secondary Education Reform in Mauritius, which is supported by World Bank funding. This reform started in 2001, and its success will be crucial to the success of the government's ambitious plans for development of Mauritius' economy and society.

This workshop and similar ones scheduled for 2002–03 will provide a forum for discussion, guidance, and exchange of best practice experiences inside and outside Africa. The region's economic and social development will depend upon closing the gap between Africa and other regions, and all African young people must be able to benefit from relevant and equitable secondary education. The countries' success in achieving this will in turn determine their success in implementing their poverty reduction strategies.

In the coming year we hope that similar informal reports will help build a knowledge base to support Sub-Saharan Africa policy- and decision-makers in improving and expanding their secondary education systems to meet the demands of the twenty-first century.

The work program on Secondary Education in Africa (SEIA) is led by Jacob Bregman, lead education specialist.

Birger Fredriksen
Senior Education Advisor
Africa Region, The World Bank

Special thanks are due to the organizers and presenters of the December 2001 UNESCO/BREDA-World Bank Regional Workshop in Mauritius on the Renewal of African Secondary Education. The following World Bank staff and consultants have contributed to this paper: Jacob Bregman, Steffi Stallmeister; Gwang-Jo Kim; J.M.A. Rameckers, Education Consultant; S.J. Howie, University of Pretoria, South Africa; and Maarten Pieters, AMSTEL-Institute, Universiteit van Amsterdam;

We would also like to thank the Mauritius Minister of Education, the Hon. Steven Obeegadoo, who hosted the workshop, and the UNESCO-BREDA staff. The Mauritius Ministry of Education staff have also been very helpful in providing logistical and other support to all the World Bank mission staff during and after the workshop. We also thank all our colleagues and country participants at the workshop for the interesting and stimulating discussions and questions. Finally, we are very grateful to the Norwegian Education Trust Fund for financing our consultants and part of the costs of the workshop.

Final editing and typesetting of this report were done by Lawrence Mastri.

1

Introduction

Workshop's terms of reference*

Secondary education holds a privileged position in all education systems. Placed between primary and tertiary sectors in structure and content, it is at the hub of all educational reforms.

In most African countries, however, secondary education is facing three common problems: (a) inadequate infrastructures, (b) improper equipment, and (c) limited laboratories and qualified staff. Despite this, society is increasingly demanding that secondary education prepare students for jobs — that is, produce school leavers who are functionally ready for work — and prepare them for higher education. To these two missions is added a third complex one: setting up admission structures for a growing school population continually emerging from the primary sector. In addition, the secondary education sector has to deal with a range of new issues, including the environment, human rights, drug addiction, AIDS, poverty, and unemployment — issues that are more social problems than educational concerns.

But, although it occupies a central position in the educational structure, the secondary education sector has been overlooked. In recent years, bilateral and multilateral aid has been directed to other sectors of education, namely primary, tertiary, and nonformal education. Reports drawn up at the OAU Conference by Ministers of Education (COMEDAF, Harare 9–15 March, 1999) and the meeting of the Consortium on Secondary Education organized by UNESCO (Paris 10th–11th June, 1999) reach the same conclusion: In order to meet the challenges of the twenty-first century and play its vital role of regulator in the education system, the secondary education sector must be reorganized.

Documents delineating strategies for the medium term (1996–2001), and UNESCO's two-year program (2000–2001) indicate that the best approach is to (a) diversify the structures to expand payment systems for secondary-level services; (b) renew study programs and pedagogy to include information technologies; and (c) eradicate inequalities.

COMEDAF and the World Education Forum at Dakar have set forth the following priorities for reorganizing the sector: equity, quality, developing complementary learning methods, reinforcing coordination skills, follow-up and evaluation, and diversifying learning methods.

Finally, in considering secondary education reforms, the role of the informal sector of the economy — which has a major impact on poverty eradication and youth employment — must be recognized.

Objectives

The UNESCO Regional Office, in collaboration with national commissions and regional bodies — including government, NGOs, and the World Bank — proposes that, in December 2001, a regional consultancy of experts be organized with the following goals:

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* *As outlined by UNESCO-BREDA*

- Examine the subsystem of secondary education in Africa at the beginning of the twenty-first century (the operational and the nonoperational, programs and contents, adaptability and inadaptability of structures, equalities and inequalities, equities and inequities, etc.);
- Analyze problems related to the transition between basic and secondary education in order to propose learning strategies for solving unemployment and youth poverty;
- Explore new approaches to in-depth reforms;
- Identify priority needs that would allow the subsystem to meet the expectations of the population;
- Encourage an international, regional, and national dynamic cooperation of stakeholders (consortium) that would bring reforms and encourage the development of secondary education in Africa.

Expected outcomes

With the advent of this regional consultation of experts, the following may be expected:

- Better understanding of this subsystem within the region;
- Identification of difficulties, and the measures and strategies being adopted by governments to resolve them, while addressing the specific urgency of reconstructing this subsystem in countries going through or recovering from crises;
- Publication of guidelines and general orientations for reforms in the subsectors;
- Elaboration of a concrete regional action plan, to be undertaken in the next biennium, that would include pilot projects executed at national and subregional levels;
- Setting up of an international partnership (consortium) for secondary education reforms.

Proposed topics

1. Partnership in the governance and management of schools

Because secondary level education has been considered the concern of government ministries, communities (municipalities or communes, the civilian community, the NGOs) have not been heavily involved in managing and administrating secondary level educational institutions. But schools at all levels are everyone's concern. Education is linked to so many societal problems, even at local levels: unemployment, poverty, drug addiction, AIDS, and militia recruitment in countries at war. Secondary education must be part of the discussion about the needs of youth at all levels of society, and must involve the local communities in its day-to-day management. Community schools, which until now have been a limited innovation to basic education, have to be extended to secondary education.

2. The curriculum

Because of secondary education's middle position between primary and tertiary levels, programs have had a functional role: giving students access to higher education, preparing students for lifelong education, and preparing students for work. In addition to these traditional functions, society is increasingly demanding that secondary education encompass subjects such as the environment, human rights, drug addiction, AIDS, poverty, and unemployment. Secondary schools should therefore assume a new function: preparing youth for life and citizenship and for collective as well as individual responsibility. In order to integrate these new topics and subjects into secondary education, programs, contents, and even structures must be redefined to meet the needs of modern society.

3. Secondary education reforms and teacher training

Teaching plays a central role in all educational reforms. The Delors Commission writes: " Improving the quality of education goes first through the recruitment of teachers, their training, their social status and working conditions, for much cannot be expected of them if they do not have the knowledge and skills, personal qualities, and motivation." ("Education: A Hidden Treasure." Delors Commission, page 158)

Secondary schools need skilled teachers ready to cope with the knowledge explosion and manage an ever-growing and complex educational system. Teachers must be able to integrate into their programs new subjects, such as environment, demography, health science, human rights, democracy, and new technologies, as well as information and communication. Thus, teachers of the new millennium must be better trained and motivated, and teacher training must be ongoing — that is, a permanent recycling process that maintains and updates knowledge, while providing avenues for continuous acquisition of new skills.

Though working within difficult economic and pedagogical environments, teachers do not always receive support and are often not motivated. Improving their environment is therefore essential for the success of all educational reforms.

Mechanisms for involving teachers in management of schools should also be encouraged.

4. Managing transitions and educational innovations

Some fundamental question are: what type of secondary education should be organized to prepare for the future? how would teaching structures cope with the foreseeable increase in school populations? what innovations and reforms would be introduced? how should secondary education be structured within the system to allow dropouts to reintegrate into the system at later stages?

5. Problems related to access, equity, and quality

Access to education means that every child should be able to acquire the knowledge to live in and adapt to a rapidly changing world. And eliminating the inequalities that prevent children from going to and staying in school should be part of any quality education program.

Special attention should be given to inequities caused by gender, socioeconomic status, or other type of marginalization. Wars and conflicts have an adverse impact on populations, particularly young people and small children, special groups that any reform should address.

The concept of quality has many dimensions: the conditions and consequences of learning, the socio-economic and cultural relevance of the content of teaching, and the impact of the environment on the educational process. All these dimensions lead to the notion of internal and external efficiency of the system, with the resulting need to consider dropouts and the quality and quantity of the certificates awarded in relation to the needs of the country.

2

Secondary Education in Africa (SEIA)

A Regional Study of the Africa Region of the World Bank

Jacob Bregman
Steffi Stallmeister

Investment in secondary education (SE) yields considerable social and private returns.[1] And in Sub-Saharan Africa there are four critical reasons for investing in secondary education:

First, secondary education is crucial for economic growth. Globalization, the increasing importance of ICT in the twenty-first century, and rapid technological change have made knowledge essential for competing in the world economy. Secondary education provides countries with the skills and knowledge needed for economic growth, including further learning and training of professionals such as technicians, scientists, and entrepreneurs[2] (Box 1).

Next, secondary education helps to socialize young people and target at-risk youth. Because this age group has the greatest potential for changing its behavior,[3] secondary education can be decisive in fostering positive social and civic values.

Third, secondary education yields considerable private returns, offering young people the chance to acquire attitudes and skills that are unlikely to be developed in the primary grades. This in turn enables youth to develop job-oriented skills, participate fully in society, take control of their own lives, and continue learning.[4]

Finally, the demand for secondary education, especially at the lower secondary level, is increasing rapidly. The dependency ratio — the number in the economically "nonactive" to "active" population — in Sub-Saharan Africa is the highest in the world (Graph 1). Since the World Declaration on Education for All (EFA) (Jomtien 1990), many Sub-Saharan Africa countries have increased enrollment rates significantly at the primary level — and a growing number of primary students, notably girls, wish to

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Before joining the Bank's Africa Region he worked in the Middle East and North Africa, South Asia, and Latin America and Caribbean Regions. He holds a Master's Degree in Organic Synthetic Chemistry from the University of Groningen and in Science Education from the Technical University of Delft in the Netherlands.

Mr. Bregman started as a secondary school science teacher, and lived and worked for eight years in Africa as a professor of chemistry and science teacher trainer for Dutch Universities. As project director he contributed to building sustainable education management information systems, and developing local knowledge systems in science and mathematics disciplines, and the reform of secondary education. Between 1987–1989 he was an independent management consultant and director of studies at the Management for Development Foundation in the Netherlands, and was responsible for developing and managing courses for senior government and private sector officials in project management and ICT. Jbregman@worldbank.org

Steffi Stallmeister holds a Master Degree in Education from University of Muenster, Germany, and one in International Affairs from the American University, Washington, D.C. She currently works in the Africa Region of the World Bank as an education specialist, focusing on secondary education.

Before coming to the World Bank she worked as an education and training advisor for the GTZ (German Development Cooperation) in Indonesia. During her time in Indonesia she focused on school-to-work transition, in-service teacher training, and private provision of education and training.

In September 2002 she will become a World Bank Young Professional. Sstallmeister@worldbank.org

Box 1 Human development and technological advances

...can be mutually reinforcing, creating a virtuous circle. Technological innovations in agriculture, medicine, energy, manufacturing, and communications were important — although not the only — factors behind the gains in human development and poverty eradication. The evidence that technology helps development is strong. The decline in mortality rates that took more than 150 years in the now-developed world took only 40 years in the developing world, in large part thanks to antibiotics and vaccines. The development of oral hydration packets — a simple solution of sugar and salt that increases the absorption of liquids — has cut the cost of treating diarrhea and has saved millions of lives. The problem remains that the great majority of technological advances are produced by, and for, rich countries. In 1998, nine-tenths of new patents went to OECD countries, home to only one-fifth of the world's population. Of the US$70 billion spent on health research in 1998, a mere US$100 million went to malaria research. In the unequal distribution of technology, there is a market failure, both national and global. At the national level, the Human Development Report 2001 stresses proper incentives to invest in research and development, with a greater emphasis on education because good research demands a critical mass of well-educated workers.

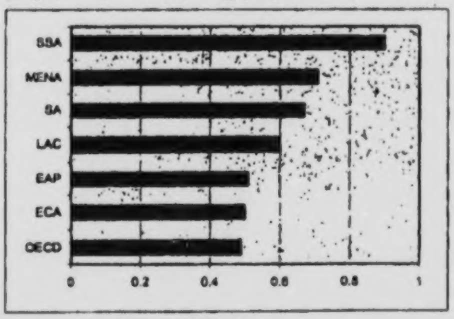
Source: The Economist, July 14, 2001.

continue to secondary, especially lower secondary, schools.[5]

Expanding lower secondary education will mean a greater demand to finance secondary education services. In FY2000 over 13 percent of World Bank lending for education and training in Sub-Saharan Africa was for secondary education, more than twice as much as in FY99. Currently, access to secondary education is limited to a privileged few in SSA; less than one-third of this age group is enrolled in secondary schools. And, while expanding secondary education will require a substantial increase in public resources, many SSA countries face severe financial constraints. The costs of lower as well as upper secondary education are high — and unsustainable if participation is to be increased. Access cannot be expanded without major changes in the way secondary education services are delivered. The changes include modification of structure and organization, improved teacher management, alternative modes of delivery, and alternative methods of financing.

This concept paper for the regional study "Secondary Education In Africa" (CP/SEIA) is the result of an extensive consultation and review process with educators and policy-makers in Sub-Saharan Africa, as well as with donor agencies and World Bank human development staff. The review and feedback process will continue throughout the SEIA study implementation. The CP/SEIA was discussed during an internal Bank-wide review meeting[6] on June 12, 2001, chaired by Birger Fredriksen (Director Human Development Africa Region, AFTHD), and attended by World Bank task team leaders, sector managers, educators, and peer reviewers. The CP/SEIA was also presented and discussed during an international education workshop at the Institute of Development Studies in Sussex (June 2001), which was attended by education task teams and specialists from the African Development Bank (ADB) and the World Bank's Africa Region. Subsequently, the CP/SEIA was presented and discussed at the ADEA Conference in Arusha, Tanzania in October 2001. It was also discussed at the joint UNESCO-World Bank workshop on secondary education, hosted by the Government of Mauritius in December 2001, which representatives from some twenty-eight African countries attended. This revised CP version incorporates comments and suggestions made by attendees of these events.

Graph 1 Age dependency ratio (dependents to working population), 1999



Source: World Bank, WDI, 2001.

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The CP/SEIA will be widely distributed to African educators, institutions, and donor agencies in order to seek cooperation, guidance, ownership, and broad collaboration for the forthcoming implementation of the seven thematic studies, the scheduled workshops, and the final summary reports. The purpose is to focus on practical solutions and review best practices within the African context. The SEIA study will be executed in two phases (Phase I: December 2001 – June 2003; Phase II: July 2003 – June 2004). Several bilateral donor agencies and the World Bank pledged financing for the study; however, funding is still being sought for some activities. The World Bank's SEIA coordinating task team will seek African participation and inputs. Overall SEIA peer reviewers are Messrs. Mourad Ezzine (senior education specialist, AFTH2), Jamil Salmi (sector manager, HDNED), Vincent Greaney (lead education specialist, SASED), Guillermo Hakim (senior labor market economist, MNSHD). External peer reviewer is Professor. Keith Lewin, University of Sussex. Other external peer reviewers for the specific SEIA products and outcomes are still being sought.

We gratefully acknowledge thematic studies, workshop, and consultant funding by the Norwegian Education Trust Fund, the Dutch Trust Fund, the French Government, and the Irish Education Trust Fund. The next step will be to carry out the proposed seven thematic studies, the literature and donor program review, and the scheduled workshops for Phase I. These will be contracted out to international consultants and research institutes on a competitive basis. Criteria for selection will include close collaboration with consultants, educators, and research institutes in Sub-Saharan Africa. Three internal and external reviewers will review each thematic study and synthesis paper. Efforts to fill the current funding gap will continue.

The SEIA study

Objectives

The SEIA study's intended audience is (a) policy makers in Sub-Saharan Africa, (b) African educators, (c) World Bank task team leaders, and (d) donor organizations and NGOs. The study will summarize major lessons for reforms in secondary education in Sub-Saharan African countries and draw from successful reforms in other regions. SEIA will offer a forum for discussion and policy dialogue among educators, government policy-makers, and donors in Sub-Saharan Africa.[7] This process-oriented approach will result in (a) ownership and commitment among Sub-Saharan African policy-makers and educators for SEIA, and (b) a demand-driven output. The outcome will be the presentation of evidence and best practices that show how expanding and improving secondary education can help reduce poverty and contribute to overall economic and social development in Africa, and what the Bank's role might be in this context.

The SEIA study's goals are:

- Collect and summarize best practices and identify sustainable development plans for expanding and improving the quality, equity, and efficiency of secondary education in SSA
- Identify policy options for the development of a strategic agenda for implementation of secondary education reforms in Sub-Saharan African countries
- Make recommendations about how donor agencies can better coordinate and support secondary education reform agendas in Sub-Saharan Africa.

SEIA outputs

- Seven thematic studies
- Comprehensive database on best practices in secondary education, accessible via the Internet
- Summary analyses (about 3 – 5) of ongoing and completed country-specific studies in secondary education, depending on existing study pro-

grams, in cooperation with education task team leaders and local educators, and funded by non-SEIA resources

- Literature and donor program review of best practices and trends in secondary education
- Approximately four regional workshops in Sub-Saharan African countries discussing strategic secondary education reforms, resulting in summary reports of Phase I (December 2001–June 2003) and Phase II (July 2003–June 2004).

Scope and methodology

The SEIA study will contribute to existing research by Sub-Saharan countries, other international research on secondary education, and ever-growing evidence that secondary education is crucial for social and economic development. SEIA will be implemented in two phases:

Phase I: December 2001–June 2003. During Phase I a literature and donor programs review of best practices and research for the seven thematic studies will be carried out, and seven draft reports will be produced. In addition, two regional workshops will be held to discuss the findings, and materials will be made available through a database and the "Secondary Education In Africa" website.

Phase II:July 2003–June 2004. Outcomes of the seven thematic studies, the results of 3–5 specific country studies in secondary education, and the findings of the literature and donor program review will be discussed in two regional workshops; final reports will be produced.

SEIA aims to expand upon existing analytic work on secondary education. This includes specific country case studies that have been completed or are now underway. The SEIA study will focus on seven thematic studies of the main challenges in many SSA countries. A comprehensive synthesis of the findings will be prepared at the end of each phase. The seven thematic studies are:

- "Access, financing, and equity: what are the policy options for a sustainable and equitable expansion and financing of secondary education in Sub-Saharan Africa?"
- "How can education transition processes and related mechanisms from primary to secondary, and from secondary to tertiary, be made more equitable and efficient in the Sub-Saharan African context?"
- "Governance, management, and accountability at the secondary level: how can Sub-Saharan African countries connect to current secondary education reform trends?"
- "Secondary school teachers and school principals: recruiting, retaining, and retraining"
- "How can the relevance and quality of curricula, teaching, learning, and assessment be improved at the secondary level?"
- "The link between health and social issues and secondary education: life skills, health, and civic education"
- "Secondary science, mathematics, and ICT — relevance and quality: what are the costs and benefits?"

An encouraging amount of research, analytical work, and other studies are underway or were produced over the past five years. Some examples of relevant secondary education work the SEIA study will build on are:

- *ADEA.*[8] ADEA working groups conducted several country case studies on policies, practices, and mechanisms relating to the financing of education in Sub-Saharan countries[9](http://www.adeanet.org).
- *IIEP Secondary education project.* The goals of this study are to (a) compare country strategies for expanding secondary education systems and (b) facilitate an exchange of information on policy issues. The SEIA task team is cooperating with the IIEP (http://www.unesco.org/iiep/english/research/secondary.htm).
- *Demographic and health surveys.* These surveys are nationally representative household surveys with large sample sizes of about 5,000 households. DHS surveys provide data for a wide range of indicators,

including school enrollment, school attendance, and reasons for leaving school (http://www.measuredhs.com).

- *Strategic directions for IFC*[10] *investments in education*. This paper provides a situational analysis of the most significant trends affecting the education sector in developing countries, and intends to document the private sector's growing role as a partner in education development.
- *The World Bank study on vocational and technical education and training in Sub-Saharan Africa*, which includes specific country studies.

The study will focus on lower and upper secondary education, including technical-vocational education.[11] Generally, secondary education covers grades 7–12/13, including vocational education offered within this range. The terms referring to the lower secondary level vary widely: middle, intermediate, or junior high school. Depending on the country, each term may include different grades, student ages, curriculum, and may be linked to other levels within the system. Upper-secondary level is often simply labeled secondary. This paper will use the generally accepted terminology.

Thematic studies

Thematic study 1: Access, financing, and equity: what are policy options for a sustainable and equitable expansion and financing of secondary education in Sub-Saharan Africa?

This study will focus on the following questions:

- How can Sub-Saharan African countries significantly increase access to lower and upper secondary education under sustainable financing scenarios?
- How can Sub-Saharan African countries provide incentives for private sector participation in secondary education?
- What are cost-efficient examples of distance education methods being used to provide and expand access to good quality secondary education?
- How can equity in secondary education be improved and sustained?

Box 2 Distance education in secondary education

Countries in Sub-Saharan Africa have been using distance-teaching methods to provide a second-level education for many years. Distance education can be a cost-effective education alternative for students who fail to gain admission to traditional secondary schools. Distance education courses are typically delivered through printed self-instruction materials that are supported and supplemented by radio broadcasts and study centers. The Malawi College of Distance Education for many years provided a good model of this strategy. Examination pass rates were low but roughly equivalent to those of the traditional schools. Unfortunately, funding constraints forced the college to discontinue radio broadcasts and limited its ability to provide materials. Television also can expand access to secondary education and improve its quality. Telesecundaria is a television-based rural system in Mexico that offers secondary education as part of the national system. Several other countries have adopted the program, and some are making it available to secondary schools in remote areas to enrich and improve instruction, especially in math and science. Regional collaboration would result in economies of scale and drive down cost per student.

Source: World Bank. 2001. *A Chance to Learn: Knowledge and Finance for Education in Sub-Saharan Africa*. Washington, D.C.

Expanding access to secondary education with limited financial resources. Sub-Saharan African countries face the challenge of expanding access to lower and upper secondary education, while improving quality and equity without diverting scarce resources from primary education. Unit costs at the secondary level are high, averaging several times those in primary schools.[12] The costs of lower as well as upper secondary education are high and unsustainable if participation is to be increased. In order to achieve the goal of expanding access to good quality secondary education, Sub-Saharan African countries must (a) increase the amount of public resources for secondary education and (b) render their secondary education system more cost-effective. The priorities may differ, depending on the economic and social context as well as the current character of the education system. Some countries may emphasize increasing overall enrollment at either the lower or upper secondary level, or at both lev-

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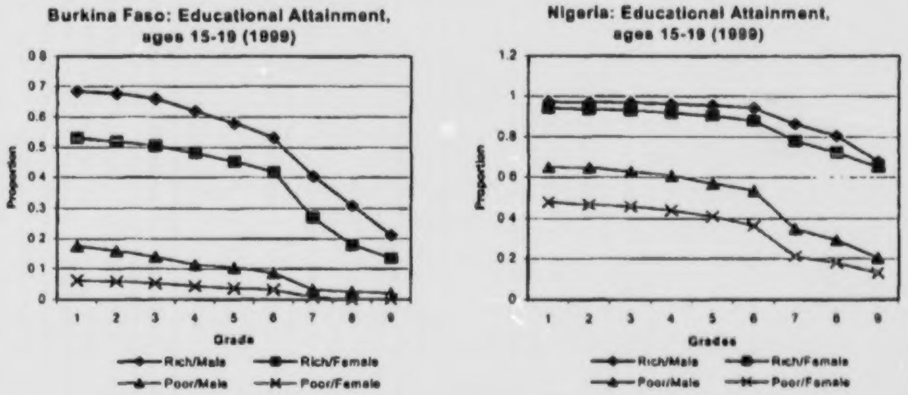
Box 3 Inequality in secondary education



Burkina Faso: Educational Attainment, ages 15-19 (1999)

Nigeria: Educational Attainment, ages 15-19 (1999)

Source: Filmer, Deon. 2000. *Educational Attainment and Enrollment Profiles: A Resource Book based on an Analysis of Demographic and Health Survey Data*. Development Research Group, World Bank, Washington, DC.

els at the same time. Other countries may want to increase internal efficiency and quality. There are trade-offs and balances of costs and benefits, both at the lower and upper secondary levels. This study will identify sustainable financing scenarios for expanding access to lower and upper secondary levels and explore how these can be brought to scale.

Cost-efficient strategies to expand access to secondary education. Access cannot be expanded without major changes in the delivery of secondary education services. Therefore, Sub-Saharan African countries are searching for financially sustainable strategies for expanding access to those currently out of school as well as to lower unit costs for those enrolled. Some of these strategies are:

- REDEFINING THE ROLE OF THE PRIVATE SECTOR. Some Sub-Saharan African countries are redefining the role of the government vis-à-vis the private sector in order to increase access, cost-effectiveness, and to achieve greater equity at secondary level. Some Sub-Saharan countries, for example, are experimenting with targeted financing mechanisms (e.g., providing public subsidies to private schools in Lesotho and matching grants in Botswana and Tanzania).
- ALTERING THE STRUCTURE OF THE EDUCATION SYSTEM. Another strategy is to re-examine the structure of secondary schooling and how it is segmented into more and less specialized cycles. This study will investigate if there are efficiency gains when lower secondary is integrated into primary education or lower secondary into upper secondary education.
- ALTERNATIVE MODES OF DELIVERY. Alternative modes of delivery (e.g., via the Internet or radio) that make use of peer learning, self-instruction, and distance methods could also reduce unit costs without diminishing quality (Box 2). Non-conventional modes of delivering secondary education may help to expand access to secondary education in low-population density rural areas. Flexible schooling alternatives may offer a second opportunity to young adults, recent dropouts, or those unable to attend ordinary schooling. This study will explore best practices where these alternative forms of delivery offer access to good quality secondary education.
- IMPROVING INTERNAL EFFICIENCY. Improving internal efficiency by lowering the high dropout and repetition rates can also reduce costs. The wast-

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age carries significant costs, both social and economic. This study will identify ways to reduce these inefficiencies.

Expanding access and improving equity. Greater equity in the distribution of educational opportunities will enable the poor to gain a larger share of the benefits of economic and social development, and contribute to an overall increase in the growth rate. Large-scale exclusion from educational opportunities results in slower economic growth, while those with access to skills and knowledge enjoy the benefits of growth.[13] However, in many Sub-Saharan African countries the secondary education systems perpetuate social and gender inequalities (Box 3). The poor may not be able to spare their children — particularly girls — from household work in order to attend school. Poor households may also not be able to afford education. The study will investigate which interventions (e.g., scholarship programs, vouchers, improving school safety, or matching the school calendar to the local agricultural cycle) are most effective in expanding access to secondary education to marginalized groups, such as girls, rural youth, and the poor.

Thematic study 2: How can education transition processes and mechanisms be made more equitable and efficient at the secondary level?

- What are successful experiences for improving the equity and efficiency of the transition process to and within the secondary education system?
- How can Sub-Saharan Africa develop and maintain cost-efficient student and parent support services?
- How can transitional problems in lifelong learning be addressed?

The challenge to improve transition processes. In many Sub-Saharan African countries secondary education suffers from high repetition and dropout rates, especially among students from poor families. The costs of these inefficiencies are significant, and the problems of those who leave early without qualification remain serious. SSA governments have to prepare young people to continue to the next stage of education or training, whether in the same or a different institution. But many students at the secondary level do not receive the guidance to help them plan their futures.

Support systems and educational pathways. The school system can provide services to help students complete the lower secondary school cycle, after which students can either find employment or continue their education. During the last years of primary and the lower secondary cycle, students need support (information, coaching, support for "learning how to learn") in order to make a successful transition. During the lower secondary cycle, many students need to make choices that will affect their professional development. In general, secondary school teachers provide the support services through various arrangements; and outside the secondary school the support services are complemented by local labor market information and employers and union services.

Box 4 Transition from initial education to working life

The issue of transition from initial education to working life has been a long-standing policy priority among OECD members. The transition from initial education to work is a key stage in the continuing progression of learning and working throughout adult life. Some of the features that contribute to successful transitions are:

- Clearly defined, well-organized, learning pathways and qualification frameworks designed and developed in a lifelong learning process;
- Attractive and accessible information, guidance, and follow-up services for all young people, integrating educational, labor market, and social counseling;
- Institutional frameworks for the organized and continuous involvement of and cooperation among all the players at the national, sectoral, and local levels in order to achieve policy coherence and effective program implementation.

Source: OECD. 2000. *From Initial Education to Working Life.* Paris.

The transition within the upper secondary cycle and from upper-secondary to tertiary is even more complex. Secondary schools must provide better job and study information in order to strengthen the connections to local labor markets and enterprises. In middle and higher income countries, this led to the development of complex systems of information and communication with the local universities and tertiary education institutes, and with the prospective job sources (enterprises, international companies). In many European countries, all secondary schools must now have an institutionalized link with local companies, and this is included in the School Development Plan.

But in Sub-Saharan African secondary schools, these links are weak — or do not exist at all — for a number of reasons: lack of expertise, other priorities, teacher working conditions, and school management responsibilities. However, providing these services is critical for (a) better functioning of the school in a more realistic framework; (b) improved streaming of students and more rational choices of subject matter for both students and parents; (c) reduction of dropout and repetition because of better coached and motivated students; (d) improved equity by targeting youth from low-income families; and (f) significant reduction of social and health problems, provided the information and support services focus on these potential problems.

In addition to support services, clearly defined, open, and coherent learning pathways and qualification frameworks can improve transition processes and are the basis for a lifelong learning process (Box 4).[14] This study will examine how Sub-Saharan African countries can improve the equity and efficiency of transition processes in light of severe financial constraints and how student and parent support services and educational pathways can be developed and financially sustained.

Thematic study 3: Governance, management, and accountability at secondary level: how can Sub-Saharan African countries connect to the current reform trends?

Box 5 The management of secondary schools — Mozambique

Secondary schools in Mozambique generally face management problems, though the quality of management varies greatly. The salary of a school director (regardless of type or size of school) is not competitive enough to ensure high quality managers. There are no performance contracts, and the nature of the system does not inspire personal enthusiasm and commitment. Management is complicated by the dual (and often triple) shift system. Management training has been limited. Most principals knew of the "Better Schools" program, but its implementation varies from province to province.

Few schools have management committees or school councils, with representation from the community and civil society. This weakens the accountability of the school to civil society in general and to the local community in particular. Less than 20 percent of secondary teachers are women, and less than 10 percent of school directors are female. This does not create many role models for girl students. The sexual harassment of girl students is reported to be an increasing problem and is not being treated as a serious management issue.

Source: "Secondary and Secondary Teacher Education Strategic Plan— Mozambique", Draft, 2000.

This theme will focus on the following questions:

- What are the needs for governance, management, and accountability at (a) central, (b) provincial or district, and (c) school and classroom levels, and how can these be improved?
- How can decentralized policy decision-making improve the effectiveness of secondary education delivery?
- How can ICT improve decentralized secondary school-based management and accountability for learning outcomes?

Institutional capacity. One reason that management and planning capacities are weak in SSA is that many secondary education systems are managed centrally. Regional and local level school administration have little flexibility in regard to adjustment of the curriculum to local needs, recruitment of staff, or the involvement of communities, parents, teachers, and students in educational decisions. As a re-

Box 6 Improving secondary education management

Côte d'Ivoire developed a management information system for secondary school students that can be used to monitor student and school results. The implementation began with a communication strategy that included posters, information leaflets, stakeholder consultation, and an information campaign through radio and television. Training local technicians in computer and organizational techniques was also a central part of the implementation strategy. The MIS proved to be useful for monitoring and managing the schools involved in the pilot project. It highlights the organizational problems that schools without a MIS have and the possible role of ICT in addressing these problems. The system provides a means for effective decentralization, which requires detailed information at the local level.

Source: "What Works and What's New in Education: Africa Speaks." ADEA, 2001.

sult, teachers and principals may not feel accountable to local communities, while parents may not wish to participate in school affairs. The effectiveness of the secondary education system management is further constrained because many education managers, especially principals, have not received enough management training (Box 5).[15] In addition, the generally weak information systems are obstacles to effective management of many African secondary education systems. Data on enrollment, learning performance, teachers, facilities, equipment, and finance is often unavailable or unreliable.

Strengthening governance, management, and accountability. In order to improve delivery of secondary education, Sub-Saharan African countries have to improve management, governance, and accountability. Accountability affects the country's transparency and inclusiveness in setting goals, and the nature of the goals determines whether system managers have clear directives. Secondary education management decides the quality of information, policy analysis, and implementation capacities.

Sub-Saharan Africa must distribute authority and responsibility with the goal of improving accountability and learning outcomes. This process implies changes in delivery and management (e.g., by using ICT), including (a) different resource allocation mechanisms; (b) different performance appraisal criteria for student, teachers, schools, school districts, and other areas of education administration; (c) different tasks for education sector professionals in both teaching and administration; and (d) elimination of some tasks. All of these imply changes in behavior among stakeholders, and education professionals at all levels may face new roles and responsibilities.

In many OECD[16] and developing countries new approaches are being tested, such as school-based management, developing school leaders, and private administration to enhance the the delivery of education. Some Sub-Saharan African countries, such as Gambia, Namibia, and Côte d'Ivoire (Box 6), developed a management information system that uses ICT to improve management and accountability within the secondary education system.

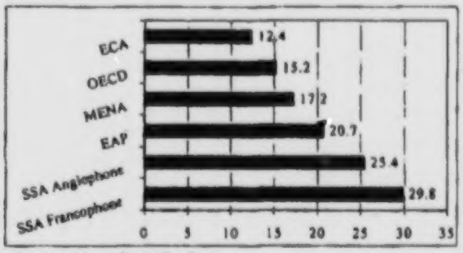
Critical questions raised by this study are: Under what conditions are such role, behavior, and power-balance changes at the central, district, and school level successful? How can governance, management, and accountability be improved at all levels? What is the possible contribution of ICT in improving secondary school-based management and accountability?

The study will also explore successful ongoing reform efforts in Sub-Saharan Africa as well as their actual effect on effectiveness and efficiency of the secondary education system.

Thematic study 4: Secondary school teachers and school principals: recruiting, retaining, and retraining

- How can highly qualified individuals be attracted to and retained in the teaching profession at the secondary level?
- What are examples of effective incentive and in-service training systems for post-primary teachers and staff performance in Sub-Saharan African countries with significant budget constraints?
- How can governments in Sub-Saharan Africa improve their relationship with unions when implementing secondary education reforms?

Graph 2 Student to teacher ratio, secondary, 1997



Source: World Bank Ed Stats.

Shortage of qualified secondary education teachers. Teacher and nonteaching staff salaries (including school principals) are the major recurrent expenditure in the education system. Because of their importance in the teaching and learning process, teachers and principals play a crucial role in determining the efficiency and effectiveness of public education expenditures.

In Sub-Saharan Africa, however, many secondary education teachers are unqualified or too narrowly qualified (normally, secondary teachers should be qualified to teach two subjects at lower secondary, and one subject at upper secondary level). In Uganda, for example, only 28 percent of the secondary teaching force are qualified enough (graduate degree), about 57 percent need to be upgraded, and 15 percent received no training at all.

The challenge to attract, retain, and retrain qualified teachers. Recruitment (selection), retaining (salary, professional development), and retraining (in-service training) of teachers and school principals are central issues in the growing demand for more secondary education access, better quality, and equity. These factors are especially important at secondary levels, where schools tend to be larger and teachers are specialized in a few or only one subject. Teaching at the secondary education level and managing a secondary school require different skills and training than similar activities in primary education. Therefore, SSA governments need to attract and retain highly skilled individuals at the secondary level.

Box 7 Guinea: Teacher-designed professional development projects

The goal of the teacher-designed professional development projects is to enable teachers to become full-partners in the reform of education in Guinea by initiating and carrying out their own professional development projects. With the help of ministry personnel designated as facilitators, team of teachers design projects and compete for small grants to carry them out. Those selected for funding are offered quasi-contracts in which the ministry promises to provide the resources teachers have requested in their proposal and budget in return for their commitments to carry out a systematic plan of activities to improve teaching and learning in their classrooms. After being piloted in two regions and part of a third in the interior of the country, the program is being expanded to all other regions.

Source: Tatto, Maria Teresa. 1999. "Conceptualization and studying Teacher Education across World Regions: An Overview." Working Draft.

But attracting and retaining bright, motivated, and well-trained teachers does not ensure high quality teaching in the classroom; many other factors affect teachers' performance in the classroom, including incentives for performance, supportive working conditions, and opportunities for training and retraining. In many Sub-Saharan African countries the remuneration systems are based on seniority, not on actual performance. In addition, many of the work environments in these countries are not conducive to teaching and learning — for example, large classes and insufficient teaching materials.

Ongoing professional and instructional support will enhance teaching and learning.[17] The question then arises what role supervisors, unions, and associations play in supporting professional development of secondary education teachers. The knowledge base on how secondary education teachers are recruited, accredited, evaluated, and promoted — and how teacher-training programs can be more cost-effective — must be improved. More information is also needed on recruitment and incentive policies as well as training programs. Finally, this study will examine how governments can improve their relationships with unions when secondary

Box 8 A land of orphans

"The boys look at the future with despair. It is very bleak," says Tsepho, at 17 a head of a household of three young boys. He had to quit school, has no job, will probably never get one. "I've given up my dreams. I have no hope." Many orphans must fend for themselves, struggling to survive. The trauma of losing parents is compounded by the burden of becoming a breadwinner. Most orphans sink into penury, drop out of school, and suffer malnutrition, ostracism, and psychic distress. "They hardly ever succeed in having a life," says Siphelle Kaseke, 22, a counselor at an AIDS orphans' camp near Bulawayo.

Source: Time, February 12, 2001.

reforms call for fundamental changes in incentive structures, training, evaluation, and responsibilities for both teaching and nonteaching staff.

Thematic study 5: How can the relevance and quality of curricula, teaching, learning, and assessment be improved at the secondary level?

- How will secondary education curricula and teaching need to change to better reflect (a) modern curricula and curricula organization and (b) the economic and social trends in Sub-Saharan Africa?
- How can emerging issues like civic education, health, and life skills be integrated into mainstream secondary education curricula?
- How can effective and relevant secondary school curricula be delivered in a cost-effective way, and how can ICT be used to improve learning and teaching in secondary schools in Sub-Saharan Africa?
- How can assessment and examination systems be used to monitor and improve the quality and relevance of secondary education?

Relevance and quality of curricula. Better links between secondary schools and the local job market must be created. Given the high cost of diversifying curricular tracks, governments are searching for ways to augment the vocational relevance of secondary schooling, for example, by introducing "prevocational curricula" or "vocationalization" of general secondary education.[18] Sub-Saharan African countries are examining how curricula can be linked to practical concerns while the costs associated with diversification can be minimized. These questions are particularly acute in light of the high underemployment among secondary school graduates.

At the same time, the absorption capacity of the domestic market in many Sub-Saharan African countries is a major constraint, and human capital, in both quantity and quality, must remain in line with the demand of the labor market.[19] The relevance of the curriculum also pertains to such emerging issues as sexual harassment in schools, violence, and HIV/AIDS (Box 8), which rarely receive proper attention in the programs. The study will address how to integrate issues of civic education, health, and life skills into mainstream secondary education curricula. It will examine how secondary education curricula can better reflect modern curricula organization and economic trends in SSA.

Delivering relevant curricula. In many Sub-Saharan African countries, there is too much reliance on rote learning and a significant lack of relevant and effective learning materials. The response of many countries in the region has been to promote computers in schools, but this carries a steep price, and will not fundamentally change the flaws in the current system. In other words, there is a great need to introduce relevant curricula changes and explore possibilities for providing more and better learning materials (school books, extra-curricula materials, ICT materials, journals, newspapers, and language materials).

Although Sub-Saharan African countries can profit from the ongoing reforms in many industrial and middle-income countries, many formidable obstacles remain. The challenge is to retrain teachers in different subjects, to develop new curricula, and to provide new textbooks and learning materials for effective learning to take place. This study will explore how relevant secondary school curricula can be delivered in a cost-effective way in the

Sub-Saharan African context. It will also review trends in using ICT to improve learning and teaching in secondary schools.

Monitoring and assessment. Weak monitoring and assessment systems remain major obstacles for improved learning outcomes at the secondary level. Systematic and internationally comparable assessment of learning in secondary education at classroom, school, and system levels is not widespread,[20] and considerable reliance has been placed on public examinations to ensure that the common curricula are covered. The examinations then affect the content and skills covered in school, and teachers gear their teaching to the examinations, which tend to encourage rote memorization. Consequently, students are given little opportunity to develop skills in observation, problem-solving, reasoning, and creativity. And unqualified teachers — who are often unfamiliar with assessment terminology and processes — will require in-service training to learn how to conduct exams and school-based assessments. This study will explore the impact of assessment and examination systems on secondary education and discuss ways to transform examinations systems into a tool for improving the quality and relevance of secondary education.

Thematic study 6: The link between health and social issues and secondary education: life skills, health, and civic education

- Which schooling programs are effective at lower and upper secondary levels to supply young people with good information on health issues and civic and life skills?
- Which learning programs are increasing participation and reducing dropout rates among at-risk youth at the secondary level?
- How can teachers and staff in secondary education become agents in tackling problems like HIV/AIDS, malaria, sexual harassment, and in promoting positive civic values?

Box 9 Education can equip girls to protect themselves

- In one district in Uganda, 32 percent of school girls and 15 percent of boys reported being sexually abused, mainly by teachers.
- In South Africa, 40–47 percent of sexual assaults are perpetrated against girls of 15 or younger.
- 55 percent of adolescent girls in rural Malawi reported being forced to have sex.

Violence and sexual abuse against women and girls is depressingly widespread. Girls learn that sexual violence and abuse are an inescapable part of going to school every day — so they don't go. Education is among the most powerful tools for slowing down and reversing the spread of HIV and reducing the vulnerability of women by contributing to poverty reduction, gender equality, and awareness of human rights.

Source: "A window of hope ... education and the global epidemic of HIV/AIDS." Draft, World Bank, 2001.
Human Rights Watch World Report, South Africa, 2001.

The HIV/AIDS epidemic is presenting special challenges to the education sector: (a) reduction in the supply of teachers; (b) meeting the needs of increasing numbers of orphans; (c) adapting to new interactions within schools and between schools and communities; (d) curriculum modification; (e) altered roles of teachers and the education system; and (f) the planning and management of the system.

In addition, violence and sexual harassment are widespread in Sub-Saharan African schools, and many parents are reluctant to allow their children — especially their daughters — to face these risks by attending schools.[21] A major concern is youth in the 12 – 19 age group, which covers lower and upper secondary education. In many countries, secondary education is characterized by low enrollment, high dropout and low completion rates, especially among the poor. Consequently, a large proportion of young people from poor families will not participate in or complete even lower secondary education. They remain excluded and at risk.

The secondary education system can respond to the social and health crisis in Sub-Saharan Africa by providing information on health issues, fostering positive civic values, teaching life skills, and by targeting at-risk youth. For example:

- *Health education.* The secondary education system is a critical entry-point for providing information to young people on protecting themselves from diseases. And people in this age group demonstrate the greatest capacity to change behavior.[22] Evidence from Sub-Saharan African countries (e.g., Senegal, Uganda, and Zambia) and Latin America suggests that comprehensive HIV/AIDS education, provided through formal and non-formal education systems, can help reduce HIV infection levels.
- *Civic education.* Rapid changes in the social, political, and economic order have prompted many countries to review their approaches to civic education, raising questions about the direction that citizenship education should take and, in particular, the contribution of schools to citizenship.[23] Secondary education can give students the skills and understanding to play an effective role in society, helping them to become informed and responsible citizens. However, there is little up-to-date information about civic education for young people in Sub-Saharan Africa, and how civic education is integrated into the curricula at the secondary level. This study will review trends of what role secondary schools play in initiating African young people into their communities.
- *Life skills and youth-at-risk.* Secondary education can contribute significantly to addressing the problems of youth violence and sexual harassment (Boxes 9 and 10). Argentina and El Salvador, for example, implement programs that try to help at-risk youth from the poorest families to complete the secondary cycle. These interventions help young students break the cycle of missed chances and exclusion, and give them an opportunity to develop skills for a better life. In addition, addressing sexual violence in secondary schools is crucial for increasing enrollment rates among girls and in the fight against HIV infection. The South African Council for Educators,[24] has distributed a framework of professional ethics for teachers, calling upon educators to refrain from any form of sexual relationship with students or sexual harassment, physical or otherwise. The council recently announced that it intends to launch a national investigation into the extent of sexual harassment and abuse of pupils by teachers.[25] The question then becomes what role teachers and their professional associations can play in tackling problems like HIV/AIDS, malaria, sexual harassment, and in promoting positive social values.

Box 10 Secondary education in Argentina: targeting at-risk youth

To address problem of violence, juvenile delinquency, and unwanted teen pregnancies, the Province of Buenos Aires introduced a special secondary education program for inner city schools: *Jornada Completa*. The "Full School Day" runs double shifts and aims to keep students in the secondary schools, improve the learning process, provide more and better equipment, and reduce "dropout and exclusion" in the secondary learning cycle. A special feature of the program is that the students in each school decide how to spend a small allocation of money, and define a work program or project for this purpose. This has been very successful, and over 80,000 "student projects" have been processed so far. Students appear to feel better "ownership" of their school, and it strengthens the school and classroom environment (lower incidences of violence, better information, more contact with the parents and communities, less street crime by "out-of-school" youth).

Although secondary education can certainly play a key role in addressing the social and health crisis in Sub-Saharan Africa, examples of good practices are hard to find. More information is needed about effective programs that address the social and health crisis in Sub-Saharan Africa. The study will explore what lessons can be learned from these experiences.

Thematic study 7: Secondary science, mathematics, and ICT (SMICT): relevance and quality: what are the costs and benefits?

- How can Sub-Saharan African countries make their science, mathematics and ICT education at secondary level (a) high-quality, (b) cost-efficient, and (c) relevant?

Box 11 Science teaching practices in southern Africa

What do we know about the actual patterns of teaching and learning — the curriculum-in-action — in science classrooms in the southern African region? Although most of the information is anecdotal, the overall impression is unfavorable. Especially because of the poor socioeconomic situation and its negative consequences for teaching conditions, science education has only deteriorated over the last decade in most African countries. Many obstacles, e.g., shortage of qualified teachers, inadequate textbooks and facilities, weak communications networks, and conflicting policies still stand in the way of effective science education programs. In particular, the quality of the science education teaching force leaves much to be desired. There are a few striking examples from different countries:

- In Botswana 56 percent of science and mathematics teachers are expatriates;
- Only about 15 percent of Namibian junior secondary teachers and 50 percent of senior secondary teachers can be considered qualified;
- Nearly 60 percent of science teachers across seven provinces in South Africa have no accredited training in science.

A variety of teacher education strategies have been tried but have shown limited results. In line with a systemic view of educational change, the entire teacher education system needs to be addressed by providing professional development opportunities for teachers.

Sources: Leo de Feiter, Hans Vonk, and Jan van den Akker. 1998. *Towards more effective science teacher development in Southern Africa*. VU University Press, Amsterdam.

- In the African context, which curricula organization should be applied (integrated, general science, single subjects) and at what point should specialization occur (core curriculum vs. electives) in view of the limited resources and the severe shortage of teachers?
- How can ICT be taught in secondary schools in Sub-Saharan Africa?

Mathematics and science education are a basis for science-based knowledge and skills.[26] And attaining high levels of scientific literacy is crucial in the new knowledge economy. Even those jobs not directly linked to science and technology often require abilities (creative thinking, rational logic, and problem-solving skills) that correlate with a good science and mathematics education. In many Sub-Saharan African countries, however, the quality and relevance of the subjects at secondary level must be significantly improved. This study will survey ways in which Sub-Saharan African countries can improve the quality, cost-efficiency, and relevance of their science, mathematics, and ICT education at the secondary level.

Teaching SMICT and teachers. Secondary education systems in Sub-Saharan Africa face important choices in science and mathematics education. In lower secondary education, the choice is whether the sciences will be taught as separate subjects or as an integrated science subject. The latter would include relevant links with environmental science. At the upper-secondary level, the choices are when and how science subjects will be taught and by which teachers.

The choices will have repercussions for the training, certification, and management of science teachers. Many secondary schools in Sub-Saharan Africa cannot offer biology, chemistry, and physics as separate subjects at the same secondary school because of a severe shortage of science-oriented teachers. In addition, the choices about the science curriculum will have important consequences for the secondary school infrastructure, i.e., science laboratories. Science laboratories and their equipment are one of the more expensive budget items.

In order to make balanced decisions, more information is needed on best practices, and experiences like the "Secondary School Science Project" (Zim-Sci) in Zimbabwe or the "South African Schools Online Project" as well as from other countries. This study will look at how and when these subjects are being taught in secondary schools. It will map out the costs and benefits of science education and ICT at the secondary level. The study will also look at costs and sustainability of science laboratories and equipment, and will survey trends and cost-effective experiences in science teacher training and certification.

Equipping students with ICT skills. Throughout the world, ICT is seen as a tool for educational transformation. It can be brought into the schools in three ways: (a) as a tool for delivery of information and/ or services, including school administration; (b) as a tool to teach other subjects,[27] or (c) as an academic curriculum subject to equip the students with skills for the knowledge economy. This study will examine the latter aspect of ICT at the secondary level.

Methodology and expected output

SEIA will be implemented in two phases. Sub-Saharan African educators and policy-makers will be consulted extensively throughout both phases. The SEIA study aims to produce a "road map" for secondary education reform, taking into account the intended audience, and helping its users to find relevant information, the main trends, and best practices. The SEIA study will continue to evolve over time — the key is to provide relevant information at the right time, structured in a way to make it accessible for the intended audience. It is also important to recognize that (a) there are many effective solutions already applied in Sub-Saharan African secondary education systems as well as in OECD countries; (b) secondary education systems are dynamic and constantly changing; and (c) many useful studies dealing with various secondary education issues have been produced in the past decade, and many more are under development. Therefore, the results of this SEIA study will build on the work of others.

The World Bank seeks cooperation with African educators and institutions to carry out SEIA. The thematic studies will be contracted out to international consultants and research institutes on a competitive basis. One criterion for selecting consultants will be their close collaboration with consultants and research institutes in Sub-Saharan Africa. This approach is intended to build on and strengthen the research capacity within the region. The World Bank will also seek technical and financial assistance from bilateral as well as multilateral donor organizations. Educators from Sub-Saharan Africa and World Bank staff will serve as peer reviewers of the thematic studies as well as the two synthesis papers.

All Sub-Saharan African countries are invited to participate in the SEIA study. The SEIA core team would agree upon the SEIA-related results from specific countries, and outcomes would be discussed during regional Sub-Saharan workshops and conferences, and be included in the final SEIA reports. Country SEIA action should include (a) a clearly identified local team with formal responsibility, (b) a local "team coordinator," and (c) adequate local resources. The following is a "choice menu" for countries to consider:

- Implement a comprehensive study of the secondary education sub-sector, similar to the SEIA seven thematic studies. A local team would execute the study. On request, the SEIA core team will provide advice.
- Select one or more specific thematic studies that have particular relevance for the country and carry out a countrywide study for inclusion in the final reports.
- Work with one or more of the universities or institutions contracted by the SEIA team to execute one of the specific thematic studies, and indicate how this will be coordinated and supported by the local team. Local educators and institution should be appointed to prepare and participate in surveys, local research, and data collection. The country would finance these activities.
- If a country has already completed a study of the secondary education sub-sector, a local team could submit existing country-specific secondary education studies to the SEIA core team. The goal would be to place the study in the regional SSA and international contexts, and compare the lessons with those from other countries and regions.
- Organize and execute regional Sub-Saharan Africa (SSA) workshops and international conferences to discuss the results of the studies and prepare a SSA regional Secondary Education Action Plan.

Costs and financing

The overall cost is estimated at about US$1.4 million. The World Bank, the Norwegian Education Trust Fund, the French Ministry of Foreign Affairs, and the Dutch Trust Fund will provide financing. The Irish Trust Fund has also promised financial support. Negotiations with other donor agencies are underway to fill the financing gap.

Annex I

Terms of Reference: Thematic study 1

Thematic study 1: Access, financing, and equity: what are policy options for a sustainable and equitable expansion and financing of secondary education in Sub-Saharan Africa?

The World Bank, in cooperation with Sub-Saharan countries and other donor agencies, has launched the Secondary Education in Africa (SEIA) study. The purpose is to identify best practices and issues for reform in secondary education in Sub-Saharan African countries. The SEIA study will contribute to existing and ongoing research on secondary education, and ever-growing evidence that secondary education is crucial for balanced social and economic development. The study will be implemented in two distinct phases:

- *Phase I:* Preparatory and study phase: Dec. 2001–June 2003. During the first phase a literature and donor program review of best practices in secondary education and seven thematic studies will be carried out. About two regional workshops will also be organized.
- *Phase II:* Dissemination of results of Phase I: July 2003–June 2004. During this phase a final summary reports will be produced, and stakeholders will be consulted through two regional workshops.

The objectives of the thematic study are to:

- Review the overall situation of expanding access to and financing of lower and upper secondary education as well as equity issues at the secondary level
- Identify and document current best and promising practices for expansion and improved quality, equity, and efficiency of delivery of secondary education in Sub-Saharan Africa
- Provide practical advice on the key issues and best approaches under conditions prevailing in Sub-Saharan Africa, including select examples from other developing and OECD countries.

Scope and content

This thematic study will focus on lower and upper secondary education. It will explore the following questions:

- How can Sub-Saharan African countries significantly increase access to lower and upper secondary education under sustainable financing scenarios and balanced sector development scenarios?
- How can Sub-Saharan African countries provide incentives for private sector participation in secondary education?
- What are cost-efficient examples where distance education methods are used to provide and expand access to good quality secondary education?
- How can equity in secondary education be improved and sustained?

Approach and activities

- Prepare a detailed work program based on the objectives of the study for review by the World Bank SEIA task team
- Review and summarize recent research findings and main issues
- Consult with World Bank staff, other donor agencies, other practitioners in the field, and policy makers
- Identify 5–8 countries to be examined in detail, in part based on consultation with Bank staff and other practitioners
- Collect information and engage in consultations in the respective countries

- Reach agreement with the World Bank SEIA task team on implementation of a survey to determine country profiles regarding access, financing, and equity issues at the secondary level
- Gather original data within the countries wherever available data is insufficient — especially on private education service providers and on costs of secondary education
- Prepare draft report
- Organize and implement workshops
- Obtain comments from World Bank and Sub-Saharan educators
- Finalize report
- Contribute to website on secondary education and produce a CD-ROM with results and findings.

Responsibilities and reporting

The consultant will work under the overall supervision of the SEIA task team and the AFTH4 sector manager and report to the SEIA task team as required. The consultant will be responsible for coordinating and conducting consultations with other donors and agencies. Field research in the identified countries should be conducted by or in close collaboration with national consultants or research institutes in Sub-Saharan Africa. The consultant will provide the overall research framework and guidelines to ensure the comprehensiveness and comparability of the case studies. The consultant is expected to attend a workshop to disseminate and discuss the findings of the thematic study.

Selection

Implementation will be contracted out to a consultant and/or international agency. The choice of the consultant will be made based on a shortlist of about four proposed candidates who will be invited to submit detailed terms of reference (TOR) to the World Bank's SEIA team for evaluation.

Timetable

Terms of reference, including detailed outline of the study	February 2002
First draft report	December 2002
Review	February 2003
Workshop	April 2003
Final synthesis and report delivery	May 2003

Costs and financing

The thematic studies will be contracted out to international consultants and/or research institutes, preferably in Sub-Saharan Africa.

Annex II

Terms of Reference: Thematic study 7

Terms of Reference (TOR) for a thematic on Science, mathematics, and information and communication technology as requested by the World Bank, by the International Cooperation Center of Vrije Universiteit Amsterdam[28] (VUA/CDCS)

Investments in secondary education (SE) yield considerable social and private returns, and the expansion of secondary education is on the agenda in many countries in Sub-Saharan Africa. The pressure to expand lower secondary education translates into an increasing demand to finance secondary education (SE) services.

SE plays a decisive role in fostering positive social attitudes and civic values, and in fighting drug abuse and diseases like HIV/AIDS and malaria. SE provides the opportunity to acquire attitudes, skills, and competencies that are unlikely to be developed over the primary grades. These skills enable youth to develop job-oriented skills, participate fully in their society, take control of their own lives, and continue learning.[29] The demand for secondary education, especially at the lower secondary level, is increasing rapidly. The challenge will be to identify successful and sustainable strategies for expanding access to a high-quality secondary education.

Against this background the World Bank's concept paper for the study on Secondary Education in Africa (CP/SEIA)[30] suggests that seven to eight thematic studies be executed to evaluate best practices and lessons learned in Sub-Saharan African countries and highlight successful reforms from other OECD countries. The SEIA study outcomes are intended to encourage discussion and policy dialogue among educators, government policy-makers, and donors in Sub-Saharan Africa.[31]

SEIA will be implemented in two phases. Phase I will be completed around June 2003, and Phase II around June 2004. It is intended that African educators and decision-makers will contribute extensively in both phases. During the first phase, existing research and operational experiences will be reviewed and 7–8 thematic studies will be carried out. During the second phase regional workshops will be held, building on the evidence gained during Phase I. The main goal of the workshops will be to disseminate the findings of the studies and receive feedback and further insights from policy-makers and educators in Sub-Saharan Africa and other donor agencies.

Objectives of the SMICT thematic study and its expected outputs and deliverables

This thematic study (as part of the SEIA study) will cover secondary science, mathematics, and ICT (SMICT) education in Sub-Saharan Africa (SSA). The SMICT study will focus on the following questions:

- What are promising instructional practices of SMICT education in lower and upper secondary schools in SSA countries, under conditions of constraints in financial and human resources?
- How do the intended curriculum characteristics for lower secondary and for upper secondary SMICT education compare in SSA countries?
- What is the quality and relevance of the SMICT education in pre- and in-service teacher training in SSA countries? How does this training prepare teachers to teach the operational lower and upper secondary school curriculum?
- How effective are the science and ICT labs in SSA countries, and what are the general unit costs associated with these laboratories and their use? What are promising practices of productive practical work in SSA countries?

- How can ICT education be used effectively and at sustainable investment costs in teacher education, and in lower and upper secondary schools in SSA countries? What are the promising practices in SSA?
- How do the national strategies for SMICT education compare between SSA countries?

These questions and issues are being operationalized as key challenges in Appendix 1. The results of the case studies will also be discussed against the background of practices and strategies used in OECD countries.

The review and discussion of these questions related to SMICT education will be placed within the wider context of secondary education for different purposes (basic education, preparation for labor markets, preparation for higher education), of different levels of socioeconomic development, of different levels of student participation at secondary level, and of different options for overall curriculum and organizational structure and management of the secondary system. Also, within the domain of ICT, and its applications within science and mathematics education in lower and upper SE, is technology education. Coordination will take place regularly with the SEIA team to avoid overlapping with other thematic SEIA studies, which are dealing with curricula, teaching, costs, and pedagogic quality at the secondary level.

Outputs and deliverables

The study will be undertaken under the overall responsibility of the VUA/CDCS task manager, in collaboration with other research institutes and educators from the Netherlands and from SSA countries. A process approach will be followed, including extensive participation of Sub-Saharan African (SSA) experts and country representatives.

A detailed format of case studies and country profiles, based on these terms of reference, will be discussed with the World Bank's SEIA team and submitted to all collaborators for adherence.

In selected francophone and anglophone SSA countries the VUA/CDCS team will carry out quick scan SMICT surveys with local educators (consultants) to explore promising practices, current issues, curriculum content, and teaching, instruction, and assessment methodologies. The results of these quick scans will be analyzed and used as inputs for further work.

In agreement with the World Bank's SEIA task team, six to eight countries will be selected for which SMICT country profiles will be prepared. In addition, up to ten case studies will be prepared in a format that may be used for further addition of countries and case studies in case additional funding would be acquired in the near future. The draft reports of the country profiles and case studies will be discussed with the SEIA task team before being finalized.

The tentative choice of countries for the country profiles under this SEIA-SMICT study is as follows:

Anglophone SSA
South Africa, Botswana (and Namibia), Zimbabwe, Tanzania (and Kenya or Uganda)
Francophone SSA
Burkina Faso and Cameroon or Senegal or Mali.

A third potential category of countries consists of those from which the WB SEIA team with their own resources collects data, such as Mauritius, Madagascar or Côte d'Ivoire. The selected countries will also be used as a potential source for promising practices, country profiles, and case studies.

The first and crude synthesis report, the country profiles, and the case studies will be presented and discussed at a workshop with SSA countries and African educators in December 2002 (Arusha, Tanzania). In early 2003 a first draft of the final synthesis report, summarizing the findings and presenting the main conclusions and recommendations will be presented to the World Bank's SEIA task team.

	Activity	Participators	When?
a.	Review pertinent literature for key challenges; develop quick scan surveys in collaboration with WB; prepare Durban meeting	Dutch research team*	12/2001 – 2/2002
b.	Identify partners and potential countries in SSA	Dutch research team**	12/2001 – 2/2002
c.	Review scope, objectives, instruments and identify relevant country contacts during SAARMSTE[1] conference, Durban, South Africa, Jan '02 with SSA SMICT educators	Dutch research team; SSA SMICT educators ; WB SEIA team	22 – 26 Jan 2002
d.	Select countries for SMICT profiling; identify local consultants and educators to assist in carrying out the SMICT study; start preparation of country SMICT profiles	Dutch research team; SSA country educators and SSA education authorities	2/2002 – 4/2002
e.	Identify within key challenges promising practices for further study; Identify 6–8 relevant SSA countries from anglophone (at least two francophone countries) for SMICT case studies	Dutch research team**; SSA country teams; WB SEIA team	2/2002 – 4/2002
f.	Reach agreement of outline of final report and technical annexes	Dutch and WB task managers	May 2002
g.	Compose country profiles of current state of SMICT and patterns with key challenges based on readily available data, with the assistance of local SSA educators	Dutch research team; SSA country teams; WB SEIA team	4/2002 – 12/2002
h.	Study and analysis of promising practices, spread across the different challenges and countries identified above, and analyze implementation success	Dutch research team; SSA country teams; visiting Dutch researchers	4/2002 – 12/2002
i.	Review draft SMICT study reports with SSA expert forum from participating countries, WB SEIA team and with international experts.	Dutch research team* ; representative country delegates	Workshop December 2002, Arusha, Tanzania
j.	Prepare draft reports for the country profiles and the case studies; prepare the first draft version of the synthesis report; discussions with the SEIA task team	Dutch research team**; WB SEIA team	1/2003 – 4/2003
k.	Incorporate the comments (incl. WB SEIA team) into the final report and the technical annexes; translate final report into French; submit final report to World Bank	Dutch research team	4/2003 – 5/2003

* under final responsibility of the SMICT study task manager

** in consultation with the World Bank SEIA team

After a review with the SEIA team, the VUA/CDCS will distribute electronic drafts to selected African educators for further review and comments. The final version of the synthesis report, the country profiles, and the case studies will be submitted to the World Bank in early May 2003. The synthesis report will be about 30–40 pages, with an executive summary and with technical attachments and a statistical annex as appropriate. The results of this study will also be made available on the websites of the World Bank and the VUA/CDCS, and on CD-ROM.

Activities undertaken in the context of this SMICT study

VUA/ CDCS has long-standing and extensive experience in SMICT programs in SSA. Since the mid-1970s, numerous projects were executed concerning science teacher education and professional development, foundation courses and bridging programs, and curriculum development and innovation. During the 1990s VUA/CDCS participated with the University of Twente in a research program focused on strategies for science teacher development, as well as in a number of science education Ph.D studies. In addition, VUA-CDCS carried out consultancies for a variety of donors and played a leading role in organizing regional and local science education conferences. Through these activities, VUA/CDCS has an extensive professional network of science educators in anglophone SSA. Through its international network, high-caliber science educators in francophone SSA will be mobilized for the SMICT study, wherever needed, with support from the World Bank SEIA team. VUA/CDCS will provide the task manager, as well as researchers. Science educators and researchers from SSA will be part of the SMICT study. VUA/CDCS, together with the University of Twente–Faculty of Educational Science and Technology (UT–FEST) founded the DECIDE[31] consortium (Dutch Expertise Consortium for the International Development of Education) in 1999. Dutch partners in the present SEIA–SMICT study are the Department of Curriculum of UT–FEST and the AMSTEL Institute of the University of Amsterdam, one of the new DECIDE partners. UT-FEST will provide the academic supervisor as well as researchers, and the AMSTEL Institute will provide the ICT expert for this study.

Logistics, organization and coordination of the study for Phases I and II

This proposal is submitted by the International Cooperation Centre of Vrije Universiteit Amsterdam (VUA/CDCS). The overall responsibility for the study rests with Vrije Universiteit Amsterdam/ CDCS–International Cooperation Center, Education & Development Unit. Dr Marinus Kool will be appointed task manager for the study, on behalf of VUA/CDCS.

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The VUA/CDCS will be responsible for the execution of the SMICT study, all reporting, and the management and accounting of the funds for this study provided under the Dutch Trust Funds through the World Bank. The VUA/CDCS will report regularly to, coordinate with, and take into account comments from the SEIA task team leader on progress and potential bottlenecks. The VUA/CDCS will draw on its own institutional expertise, research and institutional capacity, and from other Dutch and/or international sources. VUA/CDCS will be responsible for subcontracting or cooperation.

The VUA/CDCS Education and Development Unit will organize, coordinate, and lead the research in agreed African countries. The VUA/CDCS will collaborate with SMICT education researchers from SSA. The Dutch research team will include the University of Twente–Faculty of Educational Science and Technology, and the University of Amsterdam and AMSTEL Institute (both are partners in the DECIDE consortium). The VUA/CDCS will analyze the results of the field research and do desk research. This will be summarized in a comprehensive study report. A proposed outline of the main summary and technical reports will be included in the May 2002 progress report, and agreed upon with the WB SEIA team. The SMICT study will require regular consultation with and travel to client countries, and the organization and implementation of surveys, research, and workshops in selected African countries.

During Phase I the VUA/CDCS will conduct a number of surveys to collect relevant SMICT curricula, statistical, and pedagogic data on SSA countries. Whenever possible the World Bank task managers, task team leaders, and education teams will facilitate the VUA/CDCS work and help to establish contacts and meetings with educators and decision-makers. The VUA/CDCS team will work as much as possible with local SSA consultants and coordinate with national SSA education institutes and authorities. Contacts with other donors and agencies active in SMICT education in selected countries will enable additional inputs, together with relevant results from WB surveys. The survey data will be collected and analyzed at an early stage and made available to the SEIA team.

During the first phase the VUA/CDCS will also execute more in-depth investigations regarding SMICT promising practices and lessons learned in a selected number of countries. The proposed SSA countries for these investigations are South Africa, Botswana (and Namibia), Tanzania (and Kenya or Uganda), Zimbabwe, Burkina Faso, and one of the following: Cameroon, Senegal or Mali. These SMICT investigations will cover in more detail the questions outlined above under the SMICT study objectives.

The scope, objectives, and provisional instruments of SEIA-SMICT will be reviewed and validated with SSA SMICT educators during the SAARMSTE conference in Durban, South Africa (22–26 January 2002) where many SSA countries will be represented. Relevant information and experiences from individual countries will be collected as a start towards country profiles, key-contacts at ministries, and promising practices in selected countries. The feedback obtained will be used to pilot quick-scan surveys in anglophone and francophone SSA. A network of SSA SMICT educators will be established, preferably in cyberspace. The WB-SEIA team will be encouraged to participate in the SAARMSTE conference.

SMICT study results will be presented in a concise synthesis report, with technical annexes containing more specific country information and case study findings. The draft synthesis report and findings will be reviewed with the SEIA team and the SSA experts and country representatives, and comments will be taken into account. A workshop will also be held towards the end of the SMICT study period to discuss and disseminate the results and conclusions of the SMICT study. Country workshop attendance will be on country budgets, while workshops costs are covered under this contract. To increase efficiency and reduce costs, the planned workshops will be organized to dovetail with already planned regional conferences as far as possible and feasible. The final SMICT report(s) should be presented to the World Bank's SEIA task team before the end of May 2003, and the results should be posted on the education website of the World Bank.

Appendix 1: Major Challenges for the SEIA-SMICT Study

Curriculum content, structure and relevance

How can different purposes of the SMICT curriculum (basic education and SMICT literacy, direct preparation for labor markets, preparation for further studies) be articulated, combined, and aligned at different levels in secondary education, and in relation to primary and tertiary education? And, more specifically::

SMICT curriculum in junior secondary education. Given the expansion of junior secondary education as part of 9–10 years basic education, and consequently the more diverse target group, what is a relevant and potentially effective curriculum? What are the implementation consequences (e.g., teacher qualifications) of various curriculum patterns (separate subjects, integrated, general)?

SMICT curriculum in senior secondary education. How can SMICT at senior secondary level take account of different interests and abilities of students and prepare them for different career paths? Which circumstances and conditions influence various options for offering subjects? What are potential consequences of various options in terms of student participation and cost? How can an adequate flow of students to higher education science-based programs be stimulated?

Status of computer literacy and computer science education. What should be the place of computer education and computer literacy in the curriculum (separate subject, integrated with other subjects)? What is the role and position of information and communication technologies (ICT), and in which way (extracurricular, as subject, within subjects) and at which level (teacher education, senior secondary, junior secondary) should introduction take place? To what extent does the larger ICT policy environment determine choices for ICT in education policies?

Materials, facilities and learning environments

In many countries resource constraints are an overriding factor. Often, basic conditions for effective teaching are not yet met in terms of teacher knowledge and skills and in the availability of materials and facilities. The gap between ideals and practice is often large. Furthermore, SMT instructional and assessment approaches can differ across a wide range, from teacher-centered to student-centered, with varying degrees of implementation complexity and varying levels of resource requirements, calling for a phased development approach in improving materials, facilities, and learning environments. Specific key issues are:

Curriculum and instructional materials. How can the quality and coordination of different types of curriculum and instructional materials (syllabus, teacher guides, textbooks and other student materials, tests) be improved? What is the supply and demand situation in the provision of books and materials for (a) SMICT students at lower and upper secondary levels; and (b) for SMICT teachers in most SSA countries.

Practical work and laboratories. What should be the role of practical work for students in instruction at various levels (junior, senior) and what are cost-effective solutions for provision? What are the costs of laboratory equipment, and which equipment is effective for learning in SMICT subjects? What are cost-effective solutions for SSA countries in equipping laboratories and using hands-on practices in science and technology? What are the estimated unit costs for providing science and ICT equipment and laboratories in SSA countries? What is the best layout for lower secondary science and senior secondary science labs? Are science and ICT labs a necessity (separately for lower and upper secondary education levels), or can more informal arrangements be as effective? In view of the serious financial and budgetary constraints in most SSA countries, what can be practical solutions for providing effective science and ICT education at minimum investment and recurrent costs?

ICT as learning environment. What is the potential of ICT as a learning environment at different levels (junior secondary, senior secondary, teacher education) and different access levels? How successful have SSA countries been so far in developing and implementing ICT at lower and upper secondary education levels? How is ICT used (a) in science and mathematics education; and (b) as a separate, independent subject? How cost-effective is the current ICT provision at lower and upper secondary education? Is the ICT investment at secondary level justified in view of the severe financial constraints, and do the SSA countries have sufficient qualified teachers to provide it?

Assessment and examinations

How can tests, assessment, and examinations play a positive role in the improvement of SMICT? What are the current practices in SSA countries in assessing and examining SMICT subjects at (a) lower secondary and (b) upper secondary levels? How do SSA countries compare with international SMICT results and graduate skills at comparable levels in other OECD countries?

Human capacity development

Improvement and innovation is usually a long-term learning and development process in schools, requiring a lot of attention for capacity building and human resource development. What are effective strategies for this and how can synergy of various strategies and functions in interaction with schools be accomplished?

Pre-service teacher education and teacher supply. How can pre-service SMICT teacher education be made more effective in quantitative and qualitative terms? What are alternative models to improve the qualifications of SMICT teachers and to increase teacher supply?

In-service teacher support. What are potentially cost-effective models of in-service support for SMICT teachers to improve teaching practices?

Science education leadership development. What are effective strategies and programs for SMICT education leadership development in various functions (in-school, school support and INSET, inspection, curriculum and examination development, teacher education, policy- makers)?

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1 Mingat, Alain, and Jee-Peng Tan. 1996. "The Full Social Returns to Education: Estimates Based on Countries' Economic Growth Performance." Working Paper. The World Bank, Washington, D.C.

2 Fouché, Ben. 1998. "Towards the Development of an Equitable African Information Society." *African Development Review* 10 (June/July): 134-149.

3 UNAIDS. 2000. *HIV/AIDS and the Education Sector.* Programme Coordinating Board. 11 April 2000, Geneva.

4 Lewin, Keith and Francoise Caillods. 2001. *Financing Secondary Education in Developing Countries: Strategies for Sustainable Growth.* UNESCO/IIEP, Paris.

5 ADEA. 2001. *What works and what's new in Education: Africa speaks.* Paris.

[6] The minutes of the review meeting, which was held on June 12, 2001m are available upon request.

7 The SEIA study will complement an ongoing World Bank study on *Technical-Vocational Education and Training in Sub-Saharan Africa,* coordinated by AFTH4 (Arvil van Adams and Richard Johanson).

8 Association for the Development of Education in Africa.

9 Some of these studies fed into the ADEA report "Prospective, Stocktaking Review of Education in Africa" (1999).

10 International Finance Cooperation

11 The SEIA study will overlap slightly (mainly in the area of vocational and technical *education,* as opposed to job- or skill specific *training*) with the ongoing World Bank study on *Technical-Vocational Education and Training in Sub-Saharan Africa,* coordinated by AFTH4 (Arvil van Adams and Richard Johanson). Although, the SEIA thematic studies will not repeat work already done, it will still be important to take into account the conclusions and outcomes of the TVET study for Sub-Saharan Africa.

12 Lewin, Keith and Francoise Caillods. 2001. *Financing Secondary Education in Developing Countries: Strategies for Sustainable Growth.* UNESCO/IIEP, Paris.

13 Lewin, Keith and Francoise Caillods. 2001. *Financing Secondary Education in Developing Countries: Strategies for Sustainable Growth.* UNESCO/IIEP, Paris. Appleton, Simon and Francis Teal. 1998. *Human Capital and Economic Development.*

14 OECD. 2000. *From Initial Education to Working Life.* Paris.

15 AfDB. 1999. *Education Sector Policy Paper.* Abidjan.

16 OECD. 2001. *What Works in Innovation in Education: New School Management Approaches.* Paris.

17 Lee, Valerie and Julia Smith. 1996. "Collective Responsibility for Learning and its Effects on Gains in Achievement for Early Secondary School Students." *American Journal of Education* 104 (2): 103-147. Tatto, Maria Teresa. 1999. *Conceptualization and Studying Teacher Education across World Regions: An Overview;* Working Draft.

18 ADB. 1999. "Education Sector Policy Paper." Abidjan.

19 Mingat, Alain and Jee-Peng Tan. 2001. "The HIPC Initiative: What Will It Do for Education?" *ADEA Newsletter* 13 (2).

20 World Bank. 2001. *A Chance to Learn: Knowledge and Finance for Education in Sub-Saharan Africa.* Sector Assistance Strategy, Africa Region Human Development Series, Washington, D.C.

21 Human Rights Watch. 2001. *Scared at School: Sexual Violence against Girls in South African Schools.* New York. Kelly, Michael. 2000. *The Encounter between HIV/AIDS and Education.* Lusaka.

22 UNAIDS. 2000. *HIV/AIDS and the Education Sector. Programme Coordinating Board.* 11 April 2000, Geneva.

23 Kerr, David, Anne Lines, Sarah Blenkinsop, and Ian Schagen. 2001. *Citizenship and Education at Age 14.* National Foundation for Education Research, Bershire.

24 The council, mandated by the South African Council of Educators Act 31 of 2000, is an educators' professional licensing and disciplinary body with which the government now requires all South African teachers to register.

25 Human Rights Watch. 2001. *Scared at School: Sexual Violence against Girls in South African Schools.* New York.

26 Lewin, Keith M. 2000. Linking Science Education to Labour Markets: Issues and Strategies. Secondary Education Series. World Bank Human Development Network, Washington, D.C.

27 ICT as a tool to teach other subjects will be addressed in the thematic study on curricula issues (thematic study number 5). ICT and its use in school management will be discussed in the thematic study on governance, management, and accountability.

28 In English: Free University Amsterdam, The Netherlands.

29 Lewin, Keith and Francoise Caillods. 2001. *Financing Secondary Education in Developing Countries: Strategies for Sustainable Growth.* UNESCO/IIEP, Paris.

30 Secondary Education In Africa, concept paper; Jacob Bregman (task team leader, AFTH4) and Steffi Stallmeister (German Cooperation), June 2001. World Bank, Washington, D.C.

31 The SEIA study will complement an ongoing World Bank study on *Technical-Vocational Education and Training in Sub-Saharan Africa,* coordinated by AFTH4 (Arvil van Adams and Richard Johanson).

32 More detailed overviews of SMICT in SSA experience and relevant publications are found on the websites of VUA/CDCS (www.vu.nl/cdcs), UT-FEST (www.edte.utwente.nl/), DECIDE (www.decidenet.nl) and AMSTEL Insitute.

33 SAARMSTE: Southern African Association of Research in Mathematics, Science and Technology Education.

3

Education Policies and Reform in South Korea

Gwang-Jo Kim

Introduction

South Korea (hereafter referred to as Korea) has often been cited as a successful case of economic development. Just four decades ago, Korea's social infrastructure, including school facilities, were devastated because of the Korean War, and the GNP per capita was only US$79. However, as of 2000, Korea's GDP stood at US$457.4 billion, the twelfth largest in the world.

Education has been one of the major sources of economic growth and social development in Korea. In three decades, Korea has been able to accomplish nearly 100 percent coverage for primary and secondary education. Moreover, Korea now has a tertiary education sector that is as large as those in developed countries.

This paper presents the evolution of and changes in major educational policies and reform to expand educational opportunities over the last four decades. It also examines the issues and policies needed to meet the challenges of the knowledge economy. The focus is on primary and secondary education policies since the 1960s, when the economy began to accelerate. The paper concludes by drawing implications for other countries.

Education system in Korea

The school system in Korea consists of six years of primary or elementary school, three years of middle school, three years of high school, and two years of junior college or four years of college or university. Korean children must attend classes from primary school to middle school. High schools are divided into two types: general (academic) and vocational high schools. The institutions of higher education with four-year undergraduate programs are classified into four categories: (a) colleges and universities; (b) teacher's colleges and colleges of education; (c) air and correspondence universities[1] and open universities; and (d) theological colleges, seminaries, and others.

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Two distinctive features of Korean education are worth noting: the egalitarian ideal and the zeal for education. First, the education system has evolved through egalitarianism since the modern school was first introduced in Korea about a century ago. From the beginning of the expansion process the government has been keen to ensure equal opportunity for all — regardless of gender, religion, geographic location, or socioeconomic status. Second, Korean society has traditionally placed a high value on education. The demand for more and better education has remained strong, and thus has been one of the major reasons for the severe competition for college entrance, an inordinate amount of private tutoring expenses, and grade repetition. The zeal for education was reinforced by the recent past, in which Japanese colonialism and the Korean War convinced Koreans to invest more in people than in physical capital. These factors could also explain such phenomena as extensive parental sacrifice for their children's education, and their involvement in and contribution to schools.

Educational policies for expansion of educational opportunities

Setting priorities for education

The 1960s through the mid-1970s. In 1962 the Korean government introduced a series of five-year economic development plans. The first two five-year plans (1962–1971) emphasized the growth of labor-intensive export industries, such as light manufacturing industry (e.g., clothing, textile) and consumer electronic goods industry (e.g., television sets and radios). The primary goal of the educational plan was to provide educated manpower to the economy. The curriculum during this period emphasized the practicality of education, anticommunism, and moral development. Policy efforts were concentrated on expanding basic educational opportunities to all eligible children. Short-term measures, such as increasing class size and double-shifting, were employed to cope with the growing need for basic education.

As the economy became more industrialized in the late 1960s, it became necessary to increase the supply of skilled manpower in general, and vocational and technical manpower in particular. The close link between educational and economic plans became more important during the third five-year plan (1972–1976), which stressed the development of heavy industries, such as shipyard and chemical industries. Thus, vocational and technical education at the upper secondary level was emphasized from the late 1960s and strengthened throughout the 1970s. The school curriculum became more discipline-oriented, stressing science and technology education. For instance, during this time technology began to be taught as an independent subject at middle school. Discovery and inquiry were promoted as a major teaching method.

The mid-1970s through the 1980s. During this period the government started to recognize the importance of education and other social policies in national development. The fourth five-year plan (1977–1981) included education, public health, and housing as important national policy agenda. The fifth five-year economic plan (1982–1986) emphasized a harmonious development between the economy and society. The priorities were set not only by economic pressure but also by social factors. For example, the major goal of the education reform in 1980 was to ameliorate social ills associated with severe competition for college entrance. In particular, the reform attempted to reduce private tutoring, which entailed an inordinate financial burden to parents. The school curriculum reflected this change and focused on integration of subjects (e.g., integration of history and geography into social studies at the elementary school level) and development of the whole person.

The 1990s through the present. As the economy became more diversified and changed more quickly, it became neither feasible nor desirable for the government to plan when and where the educated manpower would be most needed or to direct the

Table 1 Policy foci for economy and education

Period	Economy	Education
1960s ~ mid-1970s	1) Take-off in early 1960s: from import substitution to export-driven, light labor intensive 2) Selective strategic industries in 1970s: export-acceleration, heavy and chemical industries	1) Expansion/upgrading of primary & lower secondary education 2) Emphasis on TVET (late 1960s) * manpower planning
Mid-1970s ~ 1980s	1) Structural adjustments from late 1970s: steel, shipbuilding, etc. 2) From imitation to innovation in 1980s: electronic industry	1) Expansion/upgrading of upper secondary 2) Expansion of tertiary education 3) Strengthening of TVET
1990s through the present	1) Enhancing national competitiveness in early 1990s 2) Knowledge-based economy from mid-1990s	1) Quality enhancement for K-12 2) Public investment in higher education (e.g., Brain Korea 21*) 3) Lifelong Learning

Notes: Manpower planning was employed until late 1970s as a tool to link education and training, and the labor market. Brain Korea (BK21) introduced in 1999 is a government competitive/performance funding scheme (1.2 billion USD for seven years) to stimulate R&D training in IT, BT, and other cutting-edge technology areas.

education system's response. Society also became more democratized, and the capacity of the civilian sector increased accordingly. The use of market forces in place of government planning was a logical next step for social intervention. Thus, after the fifth economic and social development plan (1982–1986), the Korean government ceased to initiate long-term macroeconomic plans. For the education sector, this meant a shift of focus from expansion and a quantitative emphasis on manpower supply to quality, relevance, and excellence of education being provided. The corresponding change in the school curriculum can be best described as a learner-centered curriculum, where individual difference is respected.

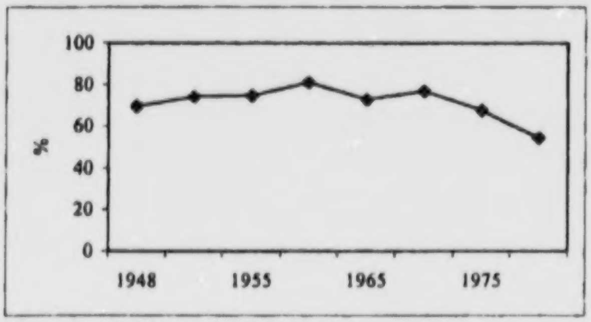
Sequencing of policy choices

Free compulsory education. The government launched its first six-year plan for free compulsory primary education in 1954 and completed it in 1959, with an enrollment rate of 95.4 percent. The six-year plan for free compulsory primary education was originally prepared in 1949, but its implementation was delayed because of the outbreak of the Korean War in 1950. This plan was financed by the enactment of the Education Tax Act in 1958[2] and through foreign aid.[3] As a percent of total government spending, the education budget more than tripled during this period, from 4.2 percent of the annual government budget in 1954 to 14.9 percent in 1959. Much of this increase was spent to build more schools and reduce double-shifting schools.

During the course of expansion, most of the education budget was allocated to primary education. The share of primary education was 69–80 percent of the education budget between 1948 and 1959, and it leveled off from a peak of 81 percent in 1960 to 54 percent in 1979. The second plan for universal primary education began in 1967 and ended in 1971. During the second plan, emphasis was on building and renovating more schools and classrooms. Free textbooks were provided to all primary school students. By the late 1960s, primary education became free to all eligible school-aged children.[4] Consequently, the operation of secondary and tertiary education during this period had to rely on private resources, such as tuitions and fees.

Expansion of secondary education. As the goal of universal primary education was fulfilled, competition for entrance into secondary schools in general, and entrance into elite schools in particular

Figure 1 Share of primary education expenditure as % of total education budget



Source: Statistical Year Book of Education (various years).

became so intense that grade repetition and private tutoring soared and quickly became a serious social concern. Extreme competition at lower levels of schooling was criticized on both education and economic grounds. It was pointed out that examination preparation would hamper the mental and physical development of a child, and that private tutoring would place excessive financial burdens on parents. The intense competition, depicted as "exam hell," stemmed not only from the supply side, since secondary school places were limited, but also from the demand side since most people preferred elite schools. This social pressure coincided well with an increase in the need for skilled workers caused by a rapid economic growth and high wages associated with a college degree.[5] The government's challenge was to expand the system equitably. The government responded in two ways: by removing barriers of student flow and by increasing capacity at secondary schools through public financing and privatization.

In 1968 the government abolished the entrance examination for middle schools and instead introduced a lottery system for student placement. The lottery was perceived as fair because placement was based on residence rather than test scores, which might reflect economic means or other socioeconomic factors. The new system, virtually eliminated all elite middle schools, and was well accepted by students, parents, and other stakeholders without much controversy. However, the government had to ensure that it would (a) increase school places and (b) strive to equalize middle schools in terms of school inputs, such as teachers and facilities. Private education providers took advantage of the changes in the entrance system and responded quickly to the new policies by scaling up their capacity to deliver education services. Prior to the abolishment of the entrance examination, some private middle schools were operating below capacity because parents did not believe in the quality of education these schools provided. Together, the new polices helped to expedite the process of education expansion at the middle school level.

In 1974 the government introduced a similar but more controversial policy known as the "High School Equalization Policy" (HSEP), which aimed to equalize or level school inputs — such as operating expenditures, student intake, class size, and education facilities — across schools.[6] A new student admission policy, which is still in effect in most metropolitan areas, was adopted. The new system replaced the individual institution's own entrance examination with the locally standardized achievement test. The change in admission policy, under the presence of excess demand for secondary education, resulted in a boost in secondary education enrollments through a mechanism almost identical to that of middle schools. Private providers of education also responded quickly by increasing their capacity to accommodate an increasing flow of students.

Vocational and technical education. The vocational education system in Korea has evolved from an original structure of three years of vocational high school and two- to five-year technical schools. Technical schools varied from schools that had both high school and junior college components, to ones that were equivalent to today's junior colleges.

From the late 1960s vocational and technical education started to attract the policy community's attention. During this period the economy, especially the manufacturing sector, began to grow quickly. And the government, with its third five-year economic plan (1972–1976), began to scale up the economy by promoting heavy and chemical industries. Because a steady supply of technical manpower was critical to the success of large-scale manufacturing industries, the government invested in building more vocational and technical high schools. In addition, it was necessary to streamline the technical education track to meet the diverse needs of the growing industries. To provide more specialized education, five-year technical schools were reorganized into two- to three-year junior colleges in the late 1970s. To upgrade the skills of the workforce while providing workers with a college diploma, the open university was institutionalized in 1981.

In the late 1980s there was another surge in demand for vocational and technical high school graduates from the manufacturing sector. This was because more high school graduates opted for college education while the service sector of the economy attracted disproportionately more high school graduates than the manufacturing sector. In 1991, in an attempt to ease the problem, the government introduced a policy to increase vocational high school enrollments up to 50 percent of the total enrollment at the high school level by the year 1998. However, this policy failed for two reasons: (a) the enrollment split between the general/ academic and vocational/technical tracks remained largely unchanged because of public preference for general education that leads to colleges and universities; and, (b) firms in the manufacturing industry began to adopt labor saving technologies such as robotics and factory automation. In 1998 the government decided to discard this policy.

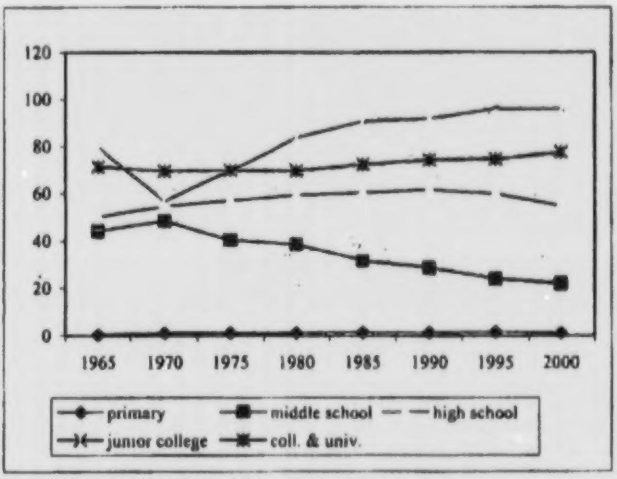
Expansion of tertiary education. Until the late 1970s the government had exercised tight control over the enrollment quota for both public and private institutions of higher education. The rationale was to keep the enrollment growth within the demand of the labor market, and to maintain the quality of education being provided. As a result, college enrollment increased only at a moderate pace until the 1970s. In 1980 the government introduced a drastic reform measure for higher education. A new national standardized preliminary test was introduced, replacing the individual college admission test. In addition, the government decided to accommodate more college aspirants by accrediting more private institutions.[7] The system of enrollment management was also changed from an Admission Quota System (AQS) to a Graduation Enrollment Quota System (GEQS), under which a college was authorized, for example, to admit 130 students but had to dismiss 30 of them by the time they graduated. College enrollment soared by more than 2.5 times between 1980 and 1990, due to the implementation of GEQS along with the accreditation of additional private institutions.

Centralization of planning and management

At the central government level, the Ministry of Education (MOE) has primary responsibility over policies and administration for general, vocational, and technical education. The MOE has direct jurisdiction over both local education authorities and higher education institutions. The MOE regulates school operations, such as enrollment, fees, curriculum, teacher recruitment, and school facilities. During the expansion period the former Economic Planning Board (EPB) — created in 1961 as a super-ministry headed by the deputy prime minister for the economy — took the lead in launching and implementing a series of five economic development plans from 1962 to 1986. Hence, the EPB played a dominant role in both setting the national agenda and resource allocation.

At the local level, educational administration is separated from the general administration of prov-

Figure 2 Trend of privatization (as % of total enrollment)



Source: Statistical Year Book of Education (various years).

inces and municipalities. Relative autonomy from local government authorities has made it easier for the local education authorities (LEAs) to secure financial and personnel resources for education. This system of local education administration was very effective in resource mobilization and allocation at the early stage of educational expansion. The LEAs were the main vehicles through which K–12 educational plans and policies were implemented. With the promulgation of the Local Education Autonomy Act in 1991, the LEAs were provided with more autonomy over financing, staffing, and setting rules and regulations for K-12 education.

Mobilization of resources for education expansion

Public resources. Korea's public investment in education is far less than the OECD average.[8] However, this should not be viewed as a lack of financial commitment of the Korean government since it has continued to increase the proportion of education spending in its overall budget. The education budget has increased steadily from 14.3 percent of the total government budget in 1963 to 20.4 percent in 2000. The education expenditure as a percentage of the GDP also increased from 2.9 percent in 1970 to 3.6 percent in 1999.

In order to finance the expansion of the education system, since 1971 the government has earmarked, through the enactment of the Local Education Grant Act, a proportion of the internal tax revenue for teacher salaries and recurrent expenditures of primary and lower secondary education.[9] In addition, the education tax was reintroduced in 1981 as a special purpose tax [10] to finance the improvement of physical conditions of primary and secondary schools. The central government distributes the revenue from these two sources to local education authorities (LEA) in the form of lump-sum education grants. The internal tax revenue is distributed based on a formula, while the revenue from the education tax is allotted evenly in proportion to the population of each province. Together, the two sources of public education finance account for 78.5 percent of the MOE's expenditures as of FY2000.

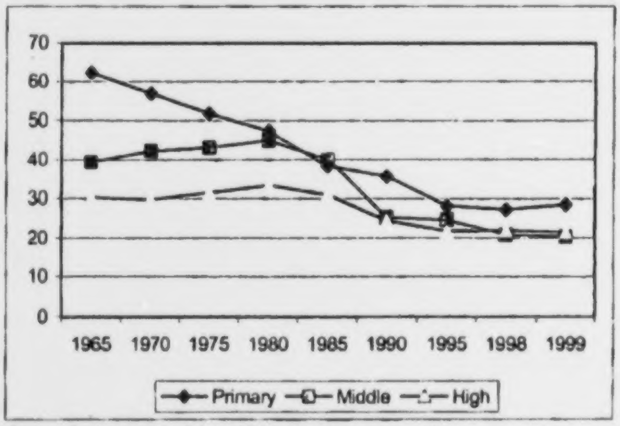
Privatizing education enterprises. As of 2000 the enrollment share of the private sector was 20 percent for middle schools, 55 percent for high schools, and 78 percent for four-year colleges and universities. The high degree of privatization was carried out by a coherent set of incentive mechanisms. Financial incentives included public subsidy, tax exemption, and other measures. The government did not provide direct financial assistance to private secondary schools until the 1970s, when admission policy was reformed. As noted earlier, private middle schools began to receive government subsidies in 1971, and private high schools in 1979. The amount of this subsidy is usually determined by the difference between the school's budget and a standard budget for a public school of the same enrollment size. The extent of privatization increased for both middle schools and high schools, reflecting the positive response from the private sector to this subsidy incentive. Thanks to the subsidy and other measures of the equalization policy, there has been no discernible quality difference between private and public schools. Since the early 1990s the government began to subsidize private post-secondary institutions on a competitive basis.

Parental resources. At the inception of Korea's economic development, the government was unable to finance school education beyond primary education. The Parent and Teacher Association (PTA), along with foreign aid, thus played an important role in financing education in the 1950s. The PTA levied a membership fee from parents, regardless of willingness to pay, for school operation. In the 1950s the PTA financed more than half of the annual school operating budget. Parents and the public — who had to bear extra financial burdens in addition to what they had already spent on private tutoring and other expenses of schooling — criticized the heavy reliance on the PTA. With this criticism, the PTA's membership fee was replaced by voluntary financial contribution of the School Sponsoring Association (SSA) in 1962. The SSA continued to contribute to the school operation budget with parents' voluntary yet de facto solicited contributions until recently. In 1996 the government introduced a School Council as one of the important measures of education reform in each primary and secondary school. The School Council, consisting of teachers, parents, alumni and community leaders, intends to promote school autonomy and democratize school operation. Consequently, the School Council now assumes the role of the SSA.

Teacher supply. Since the 1960s various policy measures were taken to meet the growing demand for teachers, including the transition of formal normal schools into teacher colleges and universities. The government introduced an incentive mechanism to induce talented high school graduates into the teaching profession. Teacher incentives were (a) tuition exemption with mandatory service and job guarantee for education majors at public teachers' colleges; (b) a guaranteed retirement age of 65; and (c) exemption from compulsory military service. To expedite the increase of teacher supply, in the 1960s the government created temporary teacher training centers, providing six months of pre-service training programs for college graduates. By the late 1970s these centers were closed as teacher supply began to exceed demand.

Since 1990 the excess supply of teachers became a policy issue. The government was unable to hire new teacher college graduates, and therefore abolished the mandatory service program. An open recruiting system was introduced in its place. From 1986 in-service teacher training institutes were established at each provincial board of education to upgrade the quality of the teaching force. After the 1997 financial crisis, the Ministry of Education took a drastic measure to lower the retirement age of teachers from 65 to 62 against harsh protests from teachers' organizations.[11] The main objective was to rejuvenate the education system by renewing and upgrading the teaching force. Almost 50,000 teachers, or 14 percent of the entire teaching force, were replaced between 1998 and 2000. Previously, only 2 percent, or 7,000 teachers, used to retire each year.

Figure 3 Number of students per teacher



Source: Statistical Year Book of Education (various years).

The government provided compensation allowances to teachers who had to retire earlier than the age they had been promised.

Performance of past policies

The educational expansion policies have significantly improved the quantitative measures of educational outcomes. There was no shortage of skilled labor, and quantity and quality trade-off was not severe. The average years of schooling have almost doubled between 1970 and 1995 from 5.74 years to 10.25 years. The illiteracy rate has decreased dramatically from 13 percent in 1970 to 2 percent in 1999. Access to educational opportunities is almost universal at the primary and secondary level. There is no discernible difference in both school attendance and academic achievement between boys and girls. The expansion process has been equitable as evidenced by school equalization policies. In particular, the rate of progression to tertiary education has more than doubled for high school graduates during the last three decades. The average class size and pupil-to-teacher ratio for primary education, for example, dropped from 65.4 and 62.4 in 1965 to 35.4 and 28.6 respectively in 1999. Results from the most recent OECD Program for International Student Assessment (PISA)[12] and the TIMSS,[13] 1995 and 1999, show that Korean students are among the top performers in both mathematics and science in OECD member countries.

Recent education reform

Issues and challenges

Despite the quantitative achievements, the quality of public education remains a significant concern. School environment is far below the OECD standard. According to a recent 1997 OECD report, Korea spends half as much per pupil expenditure as do other OECD countries.[14] In addition, students are overburdened by many subjects, rote memorization is still the main method of learning in many classrooms, and teachers are stifled with large classes and administrative chores.

Many acknowledge the contribution of education to industrialization in the 1970s and 1980s, and to democratization since the late 1980s. At the same time, critics point out that rigid central government control is a major weakness of the system. The very source of past success could be an obstacle for the future.[15] Centralized control is accused of repressing the autonomy and creativity of education providers at all levels of schooling. Many believe that government regulations have hindered change and innovation in the education sector compared to other sectors. Due to the High School Equalization Policy, for example, it has been difficult for individual schools to diversify the curricula to meet the needs of different stakeholders, including students, parents, and business firms. This, in turn, has sparked the proliferation of private tutoring, [16] which requires additional private and parental resources that otherwise could be allocated toward more productive uses.

Education reform

Against this backdrop Korea launched its educational reform efforts in 1995. Former President Kim Young Sam organized the Presidential Commission on Education Reform (PCER),[17] which prepared the blueprint for education reform, now known as the 5.31 Education Reform Proposals (ERP). The ERP has adopted market principles in education and, as such, required an overhaul of the entire education system from its users' viewpoints. The goals of the ERP are two-fold: (a) eliminate socially undesirable practices associated with school education, such as exam-oriented classroom teaching and learning process, and unreasonable private tutoring expenditures; and (b) better prepare children, as well as adults, for a knowledge society, where knowledge and human capital will be critical for the prosperity of both individuals and society. The ERP has recommended three policy actions: (a) deregulation along with increased accountability measures, such as performance-based funding; (b) curriculum reform to allow for diversification of teaching and learning at school level; and (c) integration of ICT into the lifelong education system to expand educational opportunities for all. To finance the reform measures, the ERP proposed increasing education spending up to 5 percent of GNP. Current President Kim, Dae-Jung has continued almost all the policies of his predecessor as prescribed by the ERP.

Deregulation and stakeholder participation in education governance. As noted, the rapid expansion of the education system has produced some undesirable backlashes. The most serious problem of all is a lack of flexibility, spontaneity, and creativity among educators and education institutions, which are critical to upgrading the quality of education and promoting diversity and excellence.[18] Prerequisites to this end are the deregulation of controls over school operation and the corresponding school autonomy. Equally important is securing accountability over educational quality at the school level. In the past, regulations like the school inspection system led to quality improvement at the expense of school autonomy. The government has taken several policy measures to strike a new balance between autonomy over school operation and accountability of education quality.

The government has lifted various controls over school education. For instance, direct inspection by the central ministry is abolished, and in its place performance evaluation by a professional panel has become a new way of ensuring accountability of educators, schools, and local education authorities. More importantly, there has been significant progress towards increasing stakeholder participation in school education. In 1999 the government legalized teachers' unions to improve the working conditions and welfare of teachers while increasing teacher participation in the education reform process.[19] Also, parents and communities are encouraged to take part in school operation, such as extra curricula activities and curriculum implementation with the newly introduced School Council. In order to gain momentum for education reform, the Korean government decided in 2001 to upgrade the status of the education minister to the Deputy Prime Minister (DPM) level and let the ministry oversee and coordinate not only education policies but also human resource development (HRD) policies. The DPM for education and HRD now chair the Inter Ministerial Commission for HRD consisting of eight line ministers in the cabinet.

Curriculum reform and VTE. The ERP has required that the national curriculum be reformed and updated to provide children with more options for subject matters while reducing unnecessary learning burdens. The new ERP curriculum, called the seventh school curriculum, breaks down into a common course span consisting of ten subjects from grades 1 through 10, and optional courses of two subsequent years (grades 11 and 12). The main objective of the seventh school curriculum is to promote students' learning according to their aptitudes, talents, and abilities. The common course is intended to equip students with basic life skills such as the traditional 3 R's, foreign language, literacy in information technology, and interpersonal skills. Despite some skepticism over its feasibility, the seventh curriculum is now being implemented.[20] With the seventh curriculum, for example, Korean students now begin to learn English language from grade 3 in primary schools.

In accordance with the curriculum reform, the ERP has proposed a number of ways to improve and upgrade the vocational and technical education (VTE) system. One such measure has already been operational before the ERP. It is a change in the vocational curricula at high school so that students have more field experience (two years of schooling plus one year of field experience). Another intervention proposed by the ERP is to diversify the types of high schools including "integrated" high schools and "specialized" high schools to provide more career choices to students. A third proposed change, currently being implemented, is to link vocational high schools with two- and four-year technical colleges and open universities through curricula integration and student progression. These changes reflect the view that vocational education at the high school level in a knowledge economy should not be terminal, as believed during the industrial age. Rather, it should be a prerequisite for advanced vocational education at the tertiary level in a knowledge economy that requires continual upgrading of skills and lifelong learning for everyone.

Integration of ICT and education. The ERP has proposed a set of very ambitious plans to integrate information technology (ICT) into the national education system. The proposed policies now being implemented include (a) introducing a recognition system of ICT competence at schools; (b) investing in the ICT infrastructure of all primary and secondary schools; (c) developing a school information management system (SMIS); (d) providing teachers with more ICT training opportunities; (e) amending rules and regulations of education to accommodate new technologies, including ICT, into classroom; and (f) establishing an ICT related information clearing house, the Korea Education and Research Information System (KERIS).

Substantial progress has already been made in bringing ICT into schools. Since April 2001, all of the 10,064 elementary, middle, and high schools have been connected to the Internet and the school management information system. Additionally, each of Korea's 340,000 teachers was given a personal computer, and nine new cyber universities were established and accredited in 2000.

Increased financial commitment. In order to achieve these educational goals, the government has committed to increasing the education budget. In December 1999, the government decided to secure additional public resources for education by amending the Local Education Grant Act. A grant of 1.5 trillion Won, or US$ 13 billion, per year will be added to local education budgets to refurbish school facilities from 2001, raising the share of local education grants from 11.8 percent of the internal tax revenue to 13 percent. More recently, the government has launched a seven-year, US$1.2 billion investment plan for tertiary education institutions.

Education is one of the burning issues in today's Korean society because everyone has a stake in education, and public distrust of the formal education system is soaring to an unprecedented level. Parents are blaming schools and educators for their inability to improve quality of learning and for not moving towards easing their financial burden. Teachers' organizations are criticizing the education reform as one driven mainly by a neo-liberalistic ideal, and, as such, teachers contend that the reform has damaged their morale and working conditions. The success of future reform thus depends on the government's ability to solve the interest deadlock and recover public confidence in public education.

Conclusion

The rapid expansion of education in Korea is largely accounted for by interactions of education policies, macro development strategies, and sociocultural factors over the last four decades. Owing to the idiosyncrasies of the Korean context, one must be careful not to draw direct implications from the experiences of Korean education. Nevertheless, the following points may shed some light on planning education for development.

First, for a sustainable change and reform in education, the political commitment at the inception of a national educational development plan is critical.

Second, although the authoritarian regimes made it even more possible, the centralization of various development decisions at the initial stage was effective in formulating and implementing educational goals, curriculum, assessment, and various educational programs. However, the Korean case shows that the role of effective government should be to provide appropriate structure and resources to support educational institutions, but not to micromanage to hinder creativity and progress.

Third, the orchestration of many policy measures within a solid framework of national policies was also significant. In Korea's case, this has been done through the macroeconomic development plans.

Fourth, the timing and sequence of policy choices were also important in pushing the education frontier from the lower to the upper part of the system. In Korea the policy emphasis shifted from primary education in the 1960s, to secondary in 1970s, and then to tertiary in the 1980s. Vocational education was not as emphasized as general education until the skill level of the workforce increased.

Finally, the Korean case shows that access and equity can be achieved simultaneously if the government is ready to address potential trade-offs between the two goals in the planning stages. However, it should be noted that considerable social and economic demand for education has played a pivotal role in achieving these goals in Korea.

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1 Air and correspondence universities are distance education institutions of the tertiary level, serving both the college age population and adult learners.

2 The Education Tax Act was purported to finance the free compulsory primary education plan. The Education Tax was a surtax and was levied on such taxes as property tax and house tax until its abolishment in 1961.

3 The aid was provided through the United Nations Korea Reconstruction Agency (UNKRA) from 1953 to 1958.

4 Before the second plan, school fees were charged for textbooks and other schooling items.

5 The wage premium associated with additional schooling remained high throughout the 1970s and started to compress in the 1980s (Lee 1996).

6 For a fuller account of what happened to the HSEP, see Chung (1998).

7 In Korea there has been a great deal of willingness among the wealthy people, politicians, and various religious groups to establish and run private schools, especially at the tertiary level. Thus, the approval and ultimate accreditation of private institutions has been one of the major policy regarding higher education.

8 As of 1997, Korea spent 4.4 percent of GDP as direct public expenditures for educational institutions, while OECD countries spend 4.8 percent of its GDP on average (Education at a Glance, 2000).

9 The proportion was set at 11.8 percent until 1999 when it was increased to 13 percent of the internal tax revenue.

10 The Education Tax is collected as a surtax from a number of national and local taxes, including property tax, special consumption tax, tobacco tax, alcohol tax, and gasoline tax.

11 For example, some 10,000 teachers assembled in Seoul to protest against the early retirement policy in 1998. The Korean Federation of Teachers Association (KFTA), the largest teacher's organization in Korea, organized the assembly. In contrast, parents and the general public were overwhelmingly in support of the policy.

12 Knowledge and Skills for Life: First Results from PISA 2000 (http://www.sourceoecd.com/data/cm/00003527/9601141e.pdf)

13 The Third International Mathematics and Science Study (1995 and 1999).

14 Education at a Glance (2000).

15 Lee, 2001.

16 Private tutoring is most common among people from the urban upper middle class. The main motive is to obtain a good GPA while at school and to prepare for entrance into prestigious colleges.

17 The Presidential Commission Education Reform (PCER) was composed of prominent educators, civic leaders, and journalists appointed by the president.

18 Park, 2001.

19 However, unlike a typical trade union, teachers' unions are not allowed to go on strike and other collective actions.

19 Teachers' organizations have been voicing skepticism about the feasibility of the seventh curriculum because the new curriculum requires many challenging components, including teacher training to allow some teachers to obtain a new certificate to teach a new subject; and renovation of school buildings and classrooms to enable flexible arrangement for teaching and learning.

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4

Renewal of Secondary Education Curricula and Assessment in South Africa

S.J. Howie

South African has a population of approximately 39 million people, with eleven officially recognized languages in the country. It is bordered by Botswana, Lesotho, Mozambique, Namibia, Swaziland, and Zimbabwe. South Africa is considered a middle-income country, with a gross national product per capita of $3,520 in 1996 (World Bank1998:14); it is therefore one of the wealthier countries in Africa.

However, in the 1998 Africa Competitiveness report, South Africa was placed seventh, behind Mauritius, Tunisia, Botswana, Namibia, Morocco, and Egypt. The South African Institute of Race Relations survey of 1995/96 calculated an unemployment rate of 32.6 percent of the economically active population of 14.3 million South Africans, with a rate of 41.1 percent for the African population. It is estimated that in 2010, there may be 8 million unemployed people and a shortage of 200,000 skilled workers. It is further estimated that only seven out of every 100 people who seek employment will find jobs (Gouws, 1997)

South Africa's first democratic elections were held in 1994 when the African Nationalist Party came to power. The changes brought about by the new government have been a radical departure from the past, especially in education.

This paper discusses the renewal of the South African education system, with an emphasis on the secondary education curricula renewal and on developments in the field of assessment. The paper first describes the education system, then summarizes the changes in education and the transformation (including the major policy initiatives) in education. Next, we examine the secondary education curriculum renewal regarding outcome-based education and the curriculum 2005 initiatives, and then outline developments in the field of assessment. Finally, the paper summarizes the major challenges that await SA in light of this renewal.

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Setting the context of education in South Africa

Prior to the new government in 1994, nineteen departments of education existed across South Africa. This large bureaucracy was created by the principle of separate development — apartheid — and education was separated along racial lines.[1] One national department governed the norms and standards for all other eighteen (provincial and other racially defined) departments. After 1994, one national department of education was established with nine provincial departments of education having responsibility for the operational aspects of education in the provinces.

Currently, secondary schooling comprises five years (grades 8 to 12) of schooling, which is preceded by seven years of primary schooling. South Africa has approximately 9,000 secondary schools (out of more than 29,000 schools), both government and private. The majority of these are comprehensive in nature (i.e., offer general education). Schooling is compulsory up to the end of grade 9, although absenteeism is rife and there is a high dropout rate throughout secondary schooling in particular. The School Register of Needs (2000) recorded that conditions in many South African schools are extremely poor. For instance, 34 percent of the country's schools have no running water, 67 percent of the schools have no electricity, and 34 percent have no telecommunications. In addition, 40 percent of the schools have a shortage of classrooms, and 12,000 buildings are in urgent need of repair (DoE, 2000:16).

Education change and transformation 1994–2001

The South African education system accommodates more than 12.3 million learners (50.5 percent female), 300,000 university students (54.6 percent female), and 190,000 technikon students (45.5 percent female). The system encompasses 29,386 primary and secondary schools, 375,000 educators, 5,000 inspectors and subject advisers, and 68,000 officials, managers, and support personnel (DoE: 2000b: 157–161). There are 156 technical colleges accommodating 125,000 students in the Further Education and Training (FET) sector. Equity and access are at the top of the government's priority list, and access has improved to the extent that primary education is almost universal. However, only 86 percent of South African pupils are enrolled at secondary school, and the government is still concerned about the net enrollment (DoE, 2001:5). In total, South Africa spends about 6 percent of its GDP on education (about $6 billion in 2000) (DoE, 2001:15).

Formal education has been recategorized into three levels. The General Education and Training (GET) band incorporates a reception year and learners up to grade 9, as well as an equivalent adult basic education qualification. The FET band comprises grades 10–12 in school education, out-of-school youth, and adult learners. Technical, youth, and community colleges — as well as a range of other industry-based and non-formal providers — also fall into the FET band. The Higher Education and Training (HET) band incorporates a range of national diplomas and certificates up to and including post-doctoral degrees. These levels are integrated within a National Qualifications Framework (NQF)(see Appendix 1) provided for by the South African Qualification Authority Act (RSA, 1996b).

The vision of the government is:

> *...a South Africa in which all people have equal access to lifelong education and training opportunities which will contribute towards improving the quality of life and build a peaceful, prosperous and democratic society*(DoE 1996).

Initially, the ministry focused on dismantling apartheid structures and establishing a more equitable basis for financing education. Spending was reoriented towards one budget, "allocated on the basis of racial equity, and towards redress." Primary school nutrition and school renovation projects were key programs of the Reconstruction and Development Programme (1995–1997). Since 1994 a vast number of policies have flooded the education system. Those intended to affect secondary education included:

- *White Paper: "Education and Training in a Democratic South Africa: First Steps to Develop a New System"* (February, 1995), which was seen as the fundamental framework of the education system. This was based on the 1994 education policy framework of the African National Congress and has been the main reference for subsequent policy and legislative developments.
- *The National Education Policy Act (NEPA) (1996),* which provides for the determination of national policies in general, and further education and training for curriculum, assessment, language policy, and quality assurance.
- *The South African Schools Act (SASA) (1996)* was designed to promote access, quality, and democratic governance in the schooling system. It emphasizes that all learners have the right of access to quality education without discrimination, and makes schooling compulsory for children aged 7 to 14. The Act provides for democratic school governance through school governing bodies and for two types of schools, namely, independent schools and public schools. The priorities of the school funding norms are redress and poverty. These are reflected in the funding allocations to the public schooling system.
- The *Further Education and Training Act (1998), Education White Paper 4 on Further Education and Training (1998),* and the *National Strategy for Further Education and Training (1999–2001)* provide the basis for developing a nationally coordinated further education and training system, comprising the senior secondary component of schooling and technical colleges. Among others it provides for program-based funding and a national curriculum for learning and teaching.
- The *Employment of Educators Act (1998)* was instituted to regulate the professional, moral, and ethical responsibilities and competencies of teachers.
- The *South African Qualifications Authority (SAQA) Act (1995)* provides for the creation of the National Qualifications Framework (NQF). The NQF "scaffolds" the national learning system that integrates education and training at all levels.
- *Curriculum 2005 (C2005)* focused on general education. The aim was to "move away from a racist, apartheid, rote learning model of learning and teaching to a liberating, nation-building and learner-centered outcomes-based one" (DoE, 2001:5). It aimed to allow greater mobility between different levels of education and institutional sites, and to integrate knowledge and skills through "learning pathways." C2005's assessment, qualifications, competency, and skills-based framework sought to encourage the development of curriculum models attuned to the NQF in theory and practice. The following section discusses C2005 further.

Outcome-based education and curriculum 2005

Curriculum 2005 provides the vision of what learning and teaching should be according to society's goals. It incorporates what is to be learned, processes of learning, teaching and assessment, relationships, power and authority in the system and in schools. During the apartheid period, the curriculum was very prescriptive, content heavy, detailed, and authoritarian, with little space for teacher initiative (Jansen, 1999). Teaching was primarily chalk and talk, with a strong dependency on textbooks and rote-learning.

In an attempt to depart from this status quo, the government introduced C2005, which was a huge and ambitious enterprise to radically reform education. The underlying principle of this curriculum reform was that of outcome-based education. However, two years into the implementation of C2005, a major review was done under the Curriculum Review Committee, which identified a number of weaknesses in both the conceptualization and the implementation of C2005.

The development of C2005

A number of issues had to be dealt with prior to C2005: (a) creating national and provincial education departments to provide leadership and administration; (b) designing the NQF (see Appendix 1) and related administrative structures; (c) establishing policies and frameworks for school governance and financing; (d) improving equity and capacity in the distribution of teachers, resources, and facilities; (e) building the professionalism of school managers; and (f) reframing teacher education.

This focus on learner involvement required schools and teachers to take major roles in curriculum design, according to learners' experiences and needs. They also were expected to take major responsibilities for the assessment of learners' achievements as both a guide to teaching and learning as well as for reporting and system accountability. School managers and provincial departments, especially at the district level, were expected to provide professional leadership and support in curriculum, management, and quality assurance. As a result, all the stakeholders needed professional development and training. Finally, systems of quality assurance and accountability had to be established for accountability to communities and the nation.

Curriculum 2005 was developed through an extensive process of participation and consultation and was released in 1997. Its developers considered it one of the most progressive of such policies in the world. C2005 was driven by principles of outcome-based education, learner-centered education, and the critical outcomes of the NQF, and specified outcomes and achievement standards across eight learning areas. These outcomes reflected a major change in what was supposed to be learned in schools, emphasizing competencies rather than particular knowledge. The outcomes outlined learning areas more broadly than in traditional "subjects" and in so doing created links from subject knowledge to social, economic, and personal dimensions of learning. The concept of learner-centered education meant that learners were to be involved as participants in curriculum and learning, in a way that responded to their learning styles and cultures, and built on their life experiences and needs.

However, C2005 was attacked from many quarters (Jansen, 1997, and Tema, 1997, among others) primarily because of the anticipated difficulty of implementing it in a system with so many under-prepared and under-qualified teachers.

Implementation of C2005 and problems

Implementation began in 1998 in grade 1, followed by grade 2 in 1999, grades 3 and 7 in 2000, grades 4 and 8 in 2001, and was supposed to be followed by grades 5 and 9 in 2002. Simultaneously, programs in teacher education and classroom support were implemented, involving national and provincial education departments, NGOs, television and newspapers, higher education institutions, and private publishers. There were widespread concerns regarding the implementation of C2005. The basic documents, themselves problematic, also led to a variety of interpretations by trainers, education department officers, NGOs, and writers of learning materials. This was made worse by the fact that most of the teachers and trainers' experience and habits were very different from those outlined in C2005. Additionally, very few teachers and trainers had firsthand knowledge of the kinds of curriculum and teaching envisaged, and very few schools had the capacity to manage the changes. In cases where schools and teachers embraced learner-centered education, the original vision of C2005 was lost in the implementation. Because of the attention drawn to integrating learning areas, the progression of concept development from grade to grade was often lost.

"Continuous assessment" was C2005's preferred mode of assessment, but this was interpreted by some as frequent testing, and resulted in the inevitable problem of accounting and record- keeping in the classroom, which distracted teachers from teaching, and therefore less learning took place. Training programs and support were inadequate and often did not model the approaches they were promoting. C2005 was also criticized for having a top-down, bureaucratic approach to the documents and not recognizing teachers' experiences and professional insights as inputs to their learning.

As the critics had warned, the implementation became extremely problematic, resulting in the establishment of the Chisholm Committee by the then newly appointed Minister of Education. After a three-month study in 2000, the committee concluded that the complexity of the structure and design of the curriculum had compromised the implementation of C2005. Furthermore, poor departmental support to teachers, weak support of teacher training, tight timelines, the lack of enough learning support materials, and the general lack of resources had negatively affected the implementation of C2005 (Chisholm, 2001:27). The committee recommended that C2005 be revised.

The revision of C2005

A Ministerial Review Committee was established by the Minister of Education in response to the findings of the Chisholm Committee, and given the task of refining the C2005 policy documents. A Ministerial Project Committee was established to lead, plan, and implement the process. A task team of eight coordinators of the learning area working groups and four additional coordinators were appointed.

The main findings were (DoE, 2001:21–22):

- There was wide support for the curriculum changes envisaged (especially its underlying principles), but levels of understanding of the policy and its implications were highly varied.
- There were basic flaws in the structure and design of the policy. In particular, the language was often complex and confusing (including the use of unnecessary jargon). Notions of sequence, concept development, content, and progression were poorly developed, and the scope of the outcomes and learning areas resulted in crowding of the overall curriculum.
- There was a lack of alignment between curriculum and assessment policies, with insufficient clarity in both areas.
- Training programs, in concept, duration and quality, were often inadequate, especially early in the implementation process.
- Learning support materials varied in quality, and were often unavailable.
- Follow-up support for teachers and schools was far too little.
- Timeframes for implementation were unmanageable and unrealistic — the policy was released before the system was ready, with rushed timeframes.

A revised set of National Curriculum Statements was published at the end of July 2001 for public discussion. The revisions were to simplify the structure, redefine the outcomes, and provide more guidance on progression and content. As part of the National Statements, the assessment standards were prepared for each grade level, and in each outcome. The processes and structures to support implementation were also redeveloped.

At the core of the revised national curriculum statement are eight learning area statements in the GET band (DoE, 2001b:13) that affirm that each pupil will

- Be equipped with the linguistic skills and the aesthetic and cultural awareness to function effectively and sensitively in a multilingual and multicultural society
- Display a spirit of curiosity to enable creative and scientific discovery and display an awareness of health promotion
- Adapt to an ever-changing environment, recognizing that human understanding is constantly challenged and hence changes and grows
- Use effectively a variety of problem-solving techniques that reflect different ways of thinking, recognizing that problem-solving contexts do not exist in isolation
- Use effectively a variety of ways to gather, analyze, organize, and evaluate numerical and non-numerical information and then communicate it effectively to a variety of audiences and models

- Make informed decisions and accept accountability as a responsible citizen in an increasingly complex and technological society
- Display the skills necessary to work effectively with others and organize and manage oneself, one's activities, and one's leisure time responsibly and effectively
- Understand and show respect for the basic principles of human rights, recognizing the interdependence of members of society
- Be equipped to deal with spiritual, physical, emotional, material, and intellectual demands in society
- Have an understanding of and be equipped to deal with the social, political, and economic demands made of a South African as a member of a democratic society in the local and global context.

The national curriculum statement also included the critical and development outcomes derived from the Constitution, which describe the kind of citizen that the education and training system should produce. The critical outcomes are intended to enable pupils to

- Communicate effectively using visual, mathematical, and language skills
- Identify and solve problems by using creative and critical thinking
- Organize and manage activities responsibly and effectively
- Work effectively with others in a team, group, organization, and community
- Collect, analyze, organize, and critically evaluate information
- Use science and technology effectively and critically, showing responsibility towards the environment and the health of others
- Know that the world is a set of related systems.

The developmental outcomes should enable pupils to

- Reflect on and explore a variety of strategies to learn more effectively
- Participate as responsible citizens in the life of local, national, and global communities
- Be culturally and aesthetically sensitive across the range of societal contexts
- Explore education and career opportunities
- Develop entrepreneurial capacities.

The fundamental principles underpinning the revised national curriculum are

- Outcome-based education
- Social and environmental justice, human rights, and inclusivity
- A high level of skills and knowledge for all
- Balance of progression and integration
- Clarity and accessibility.

As mentioned earlier, C2005 moved away from discipline-based subjects, as they existed in the old curriculum, towards learning areas. The eight learning areas are

- Languages
- Mathematics
- Natural sciences
- Technology
- Social sciences
- Arts and culture
- Life orientation
- Economic and management sciences.

The GET system is divided into the foundation phase (grades R–3), the intermediate phase (grades 4–6), and the senior phase (grades 7–9). Table 1 shows the GET learning programs for the intermediate and the senior phase and the time allocated to them.

The first phase of C2005 is said to have been the basis for a "transformative curriculum," while this second phase (the revision) has added substance to C2005. The main features of the revision process of C2005 were

- Design features of C2005 were reduced.
- Learning outcomes were similar but were reduced (fewer than 66 previously).

Table 1 Learning programs in the intermediate and senior phases of the revised national curriculum and the time allocated

Phase	Learning program	Time percent	Hrs per week
Intermediate phase:			
	Languages	30	10.5
	Mathematics	18	6.25
	Arts and culture	8	2.75
	Social sciences	14	5.0
	Science and technology	20	7.0
	Life skills, economy and society	10	3.50
Senior phase:			
	Languages	25	9
	Mathematics	18	6.25
	Natural sciences	13	4.55
	Technology	8	2.75
	Social sciences	12	4.20
	Arts and culture	8	2.75
	Economic and management sciences	8	2.75
	Life orientation	8	2.75

- Curriculum and qualification frameworks were developed simultaneously, and the assessment standards now allow for benchmarking pupils' performance at grades 3, 6, and 9.
- Assessment was aligned with the curriculum.
- Better balance between emphasis on integration and conceptual progression.
- Integration varied, but now there is clearer progression in the learning areas between grades.
- The languages learning area statement is developed in all eleven official languages, and the remainder of the learning area statements will be developed in all eleven languages in the future.

At this stage (November 2001), the process of developing eight learning area statements (i.e., learning outcomes and assessment standards) and the qualifications document has been completed. Feedback from the public has been received, and already the provinces have indicated that the statements can be implemented more easily and are clearer to understand. The main differences between the original C2005 documents and the revised versions are that there are fewer curriculum design features, fewer outcomes, environmental education has been integrated into the curriculum — as have human rights and inclusivity issues — there are assessment exemplars, there is clear guidance to teachers on what to teach at every grade and phase, there are implementation guidelines, and there is a qualification document for GETC.

Finally, it is proposed that the revised National Curriculum Statement become policy at the end of 2001. In 2002 piloting will take place, as will preparation for teacher orientation and the development of policy for learning support materials. In 2004 implementation will occur for Grades R to 3 and in 2005, grades 4–6. Grades 7, 8, 9 will be implemented in 2006, 2007, and 2008 respectively. The timelines imply that the first pupils to come out of the streamlined curriculum will be in 2009. However, there are also suggestions that if schools are able to implement the new curriculum earlier they may be allowed to do so.

Further education and training

Further education and training (FET) focuses on preparing pupils for higher education, for work, and for education for personal and social development. A wide range of education institutes exist that have different interests, administrative structures, and traditions. The majority of pupils are still in schools (in grades 10, 11, and 12), but many also study in colleges and through private means. However, the government considered if and how vocational education could be extended into the school curriculum. The FET curriculum is of special interest to higher education institutions that want to provide a strong foundation for their courses. As such, it has to build on and be sequential to the GET certificate (GETC) and developments in Curriculum 2005.

The National Strategy for Further Education and Training, 1999–2001 (DoE; 1999) includes strategic objectives in learning and teaching:

- Management of learning programs and qualifications framework(s) and innovation
- Increased learner participation and achievement, particularly in math, science, technology and engineering
- Learning support materials
- Flexible learning
- Learner support services
- Ongoing professional development
- Articulation and learner mobility
- Technical college and senior certificate examinations.

The curriculum framework for FET is being developed as a single national framework for schools, colleges, and private providers. It is also outcome-based and learner-centered, with unit standards and registered programs drawn from twelve fields of learning. It will culminate in a single certificate, the FETC, with two kinds of programs: (a) general/academic/vocational (offered in schools) and (b) vocationally specific (offered in technical colleges).

In both programs there will be a fundamental component (communication and mathematical literacy), a core (the area of specialization), and electives. The number of subjects available in the general/academic certificate will also be reduced, primarily where the subject's enrollments are low. This will be in relation to national needs, international trends, and the interests of most pupils. Pupils will be able to choose from a fixed portfolio of subjects and to choose *within* subjects. The department believes that this will make delivery more manageable, more equitable, and more effective.

Curriculum related policies

In order to be effective, curriculum policy and implementation must be coherent with supporting policies and programs. These include the provision of facilities and materials, management and information systems, and human resource development. One example of a closely related supporting policy is the *Norms and Standards for Educator Development*. This is a framework for pre-service and in-service education that redefines the roles of teachers consistent with Curriculum 2005, the envisaged FETC, and the roles of teachers and schools in curriculum and assessment. Within schools, management training, organizational development, and the promotion of a culture of learning and teaching are being conducted.

Although the effectiveness of this has yet to be established, pilot studies have been initiated to explore approaches that emphasize schools managing their own evaluation and planning. Other pilot studies look at the developmental appraisal of teachers (about the quality of performance) school development, and career development. Plans are underway to strengthen provincial departments' systems, especially the functions of districts in relation to school support, leadership, and administration (DoE, 2001).

Revision of assessment

Assessment in outcome-based education focuses on achieving defined outcomes. According to the Department of Education, this makes it possible to credit the pupils' achievements at every level, independent of the path they have taken and the rate at which they acquired competence. Each of the Learning Area statements contains a section on *learning outcomes*[3] and *assessment standards.*[4] These are seen as the "minimum or essential knowledge, values and skills to be covered but should not be all that is taught. They indicate what is essential for progress through the system" (DoE, 2001b) and are designed down from the grade 9 requirements. Continuous assessment was selected as being the "best model to assess outcomes of learning throughout the system." This is to be undertaken with various assessment tools and techniques; those suggested were portfolio assessment, observation sheets, journals, tests, project work, and assignments. According to the policy regulations, teachers are expected to have a sound knowledge of each of these techniques. The regulations also state that the different kinds of assessment to be used in OBE are formative, diagnostic, summative, and evaluative.

The incorporation of "continuous formative assessment" during the GET phase is intended to promote continuous learning (and lifelong learning skills) and to enable the assessment of competence and complex performances. Assessments of critical outcomes — such as problem-solving, teamwork, communication, and critical use of information — were to be measured in the context of "real performances." Continuous assessments were to be the basis for judging overall achievements and reporting to learners, parents, and the system.

The assessment for the FETC will include classroom-based (continuous) assessment as well as externally based assessment. Continuous assessment will focus on oral and practical work and achievements not easily available through written tests. However, the weighting of practical and oral assessment in the overall assessment will generally be limited to 25 percent. Face-to-face moderation, coupled with statistical moderation against standardized examination marks, will be conducted to moderate the teachers' judgments. The development of curriculum and assessment for the FETC is underway — including teacher education and trials in the applications of continuous assessment and moderation, and interventions that have increased achievements and pass rates in the Senior Certificate (at the end of grade 12).

In terms of external assessment, the General Education and Training Certificate will be awarded at the end of the GET band. This will be accredited by the NQF for the end of compulsory schooling. Currently, the Senior Certificate is awarded at the end of the FET band, after pupils have written examinations and met the specified criteria. The provincial departments of education are responsible for the externally based assessments in most subjects. From 2001 national examinations will be conducted in mathematics, languages, physical science, biology, and accounting, which are considered key subjects, as well as one other subject on a rotational basis.

Until now, no systemic evaluation has been organized nationally. However, this will change with the introduction of national assessments at grades 3, 6, and 9. This will be done using a nationally representative sample of pupils and schools at each of these grades level. The primary aim of this assessment is to determine the effectiveness of the whole system and to see how many of the goals of the transformation process are being met. At the end of each assessment, a national report card will be published.

Conclusion

Two recent international IEA[5] studies at the secondary level in South Africa highlighted the extent of the problem in education. The Third International Mathematics and Science Study conducted in 1995 (see Howie 1996 and Howie and Hughes 1997), and the repeat of it in 1999 (Howie 2001), revealed that South African pupils performance in these two subjects (mathematics and science) was very poor. Even compared to other developing and African countries, South African pupils performed significantly below the 40 and 37 countries in the respective studies. The in-depth research on the curriculum content in 1995 revealed that South Africa was not in line with the rest of the world in its secondary curricula in the two subjects.

In 1999, at the time of TIMSS-R, the Ministry of Education reported: *While the systemic changes brought about in the first five years provide a progressive and durable basis for improvements in the quality of learning, transformed learning opportunities were not yet accessible to the majority of poor people. Inequality is still writ large in the education system, and too many families are on the receiving end of an unacceptably low standard of education delivery.* (Status Report, 1999. See DoE, 2001c:6.)

In an attempt to address the clear problems in education, the then newly appointed Minister of Education outlined his Call for Action in July 1999 (DoE, 1999). The *Tirisano*[5] program (DoE, 2001a: 6–13) identifies nine strategic priorities (clustered into five programs) to serve as building blocks that, in conjunction with C2005, will transform education.

Beyond the successful implementation of C2005, the education system of South Africa faces many challenges. In order to achieve the goals of the curriculum reform process at secondary level (as well as primary), the government has to deal with the pandemic of HIV/AIDS, school effectiveness, teacher professionalism, illiteracy, the merger within higher education of teacher training colleges and universities or technikons, and improving the organizational effectiveness of the national and provincial systems of education. Plans to tackle these issues are addressed within Tirisano (DoE, 2000). However, in the case of HIV/AIDS, as many as 25 percent of the teaching force are already believed to be infected. Over the past year a study revealed that more than 1,000 teachers had died of the disease in twelve months; and this study only reviewed less than half of the teaching force (*Sunday Times*, 2001:1).

Much of the challenge lies in the effective and successful implementation of policies and less in their generation. South Africa has progressive policies, but apartheid has left little capacity on the ground to implement them. The curriculum reform has moved very slowly and is far from the originally envisaged full-scale implementation by 2005. However, with the revision of the National Curriculum Statements, there may be greater understanding among all stakeholders of what is required, and better direction from leaders of the process. Among the priorities will be upgrading teachers in content knowledge, pupil-centered teaching methods, and the latest assessment techniques. As was noted in 1999 during the implementation of C2005, "teachers' poor conceptual knowledge of the subjects they are teaching is a fundamental constraint on the quality of learning outcomes" …and "teachers by and large support the intentions of the new curriculum, but lack the knowledge resources to give effective use to these in the classroom" (Vinjevold and Taylor, 1999: 230). Sadly, as was observed during a number of studies, many teachers had neither the knowledge base or the ability to interpret the broad guidelines of C2005. Those teachers with the knowledge and ability were frustrated by the disillusioning experience of poor training provisions, lack of support, the complexity of language used, and the haste of the implementation (Stoffels, 2001). The situation regarding the less able teachers is unlikely to have changed in the past two years. It is hoped that the revision of C2005 has at least been able to address problems of interpretations and streamline the process and the curriculum documents to allow teachers easier access to the information. Without this and extensive training and upgrading of many teachers, it will be difficult to implement C2005.

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1 The racial divisions used during this time were black (African), coloured (mixed race), Indian, and white (of European descent).

2 Learning outcome is a description of what pupils should know (knowledge, information, skills, attitudes, and values) and be able to do at the end of a grade or more (DoE, 2001b:21).

3 An assessment standard describes the level at which pupils should demonstrate achievement of the learning outcome(s) and ways (depth and breadth) of demonstrating the achievement.

4 International Association for the Evaluation of Educational Achievement.

5 "Working together."

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Appendix 1. National Qualifications Framework

National Qualifications Framework Structure

NQF Level	Bands	Types of Qualifications and Certificates	
8	Higher Education and Training Band	Doctorates, further research degrees	
7		Higher Degrees, professional qualifications	
6		First Degrees, Higher Diplomas	
5		Diplomas, Occupational Certificates	
4	Further Education and Training Band	School/College/Training Certificates /Mix of units from all (NGOs)	
3		School/College/Training Certificates / Mix of units from all (NGOs)	
2		School/College/Training Certificates Mix of units from all (NGOs)	
1	General Education and Training Band	Senior Phase	ABET Level 4
			ABET Level 3
		Intermediate Phase	
			ABET Level 2
		Foundational Phase	
			ABET Level 1
		Pre-school / ECD	

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5

Recent Reforms of Science, Mathematics and ICT Education in the Netherlands in Basic and Secondary Education

Maarten Pieters

Introduction

The educational complex

Any analysis of the condition of MST[1] education in a country must address a collection of factors that influence a whole complex. They include:

- The context of the education system as a whole
- The curricula — which can be distinguished in *intended, implemented,* and *attained* curricula
- The pedagogical approach
- The methods of assessment and their repercussions on education practice
- The qualities and qualifications of teachers
- The quality of research, curriculum development, test development, teacher training, textbooks, and other educational appliances
- The connections and creative powers within the MST education's research and development community
- The connections between R&D on the one hand, and teacher training and implementation on the other
- The power of teachers' networks.

The distinction between intended, implemented and attained curriculum, and the transitions between those curriculum levels, offer productive ways of keeping track of input, coherence, and output of an education system. The other characteristics mentioned above can help in understanding relations between the curriculum levels.

Innovation

Various motives can induce innovation. A useful distinction — useful because it allows for a critical view of one's own situation, and for a comparison

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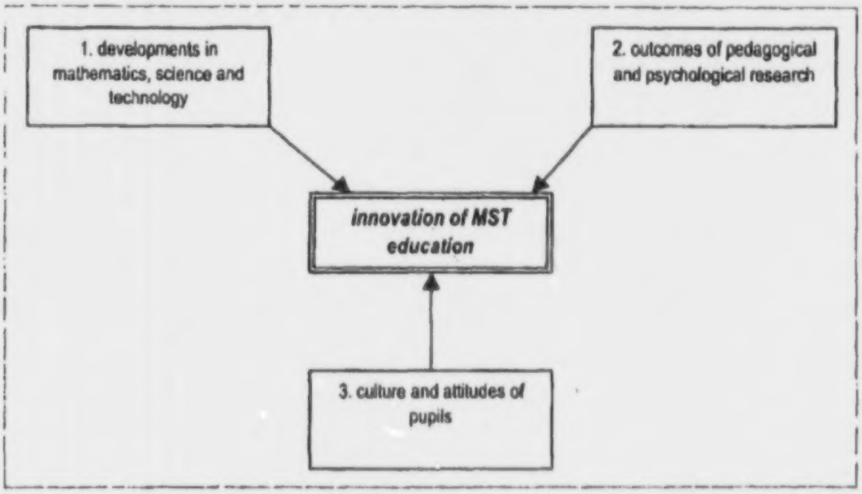
Mr. Pieters has wide experience in research and development of science, mathematics and ICT education at the pre-tertiary level, and has taught many years in secondary schools. The author has gratefully used drafts and studies by Jacob Bregman, Brigit Kuypers, and Frans Rameckers. pieters@science.uva.nl

Figure 1 Factors driving educational innovation


1. developments in mathematics, science and technology
2. outcomes of pedagogical and psychological research
innovation of MST education
3. culture and attitudes of pupils

among different countries — makes us look at developments in the culture of pupils, in subject matter, and in pedagogical and psychological insights (Figure 1).

In the past decades, a number of factors have induced changes in curriculum content and pedagogical approaches in the Netherlands. These include (a) emerging new technologies and the need for a critical reflection on them; (b) insights about the nature of knowledge and learning as the results of philosophical reflection on science and technology; and (c) pedagogical and psychological research. This latter factor also affects the contents and organization of the curriculum, including its growing stress on core competencies. The changing culture of the students emphasizes the need for more connections between inside and outside school learning and — at least in the industrialized countries — for the use of modern technologies (ICT).

The efficiency of educational change depends largely on dynamics like the match between curriculum development and assessment, the synergy between research and curriculum development, the involvement of practitioners, and attention to quality aspects of schools and other educational institutions as a whole.

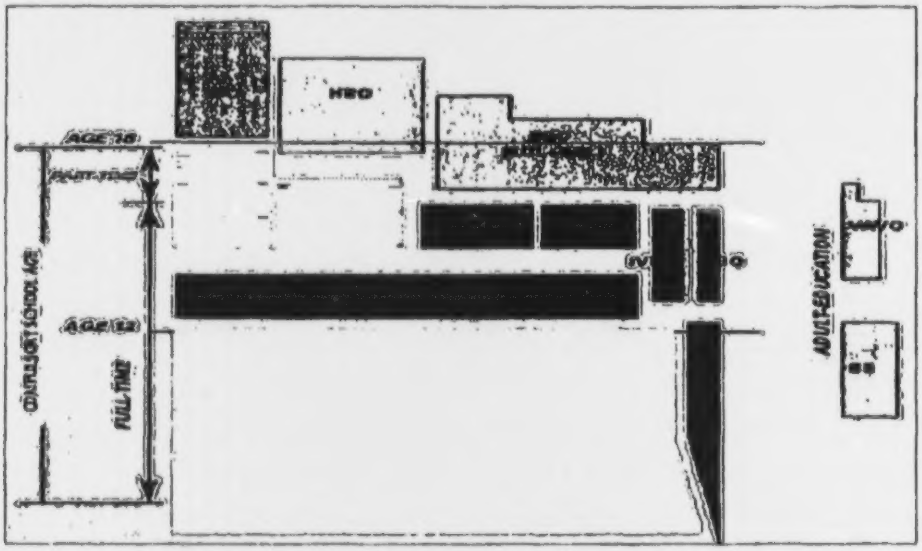
All of these aspects can be traced in countries other than the Netherlands, sometimes showing quite different features. But, at least in OECD countries, the similarities dominate, in spite of all outward differences between the curricula.

Context: the educational system

Figure 2[3] outlines the structure of the Netherlands' education system. For the purposes of this study, the main characteristics are.

- Primary education (compulsory for all) starts for four-year old children and comprises eight years (BO in Figure 2).
- Secondary education is compulsory for those younger than sixteen years. Lower secondary education holds *basic education*, comparable with a core curriculum for all (VO 1+2) and preparatory vocational education (combining VBO and MAVO in Figure 2). Upper secondary education prepares in HAVO for higher professional education (HBO), in VWO for university education (WO). "Horizontal" transitions are also possible between secondary school types, to the right in Figure 2, without time

Figure 2. Structure of the Dutch education system.



The size of each block represents the number of pupils or students in that type of education. (*Source*: Ministry of Education, Culture and Science, Information Department).

loss, to the left with the loss of one year. Although the basic education ideal is to offer all students the same core curriculum — which is adapted in the classroom to address different types of students — the reality is that during basic education students are already streamed in ability related classes. The Education Council recently advised the minister to introduce a formal distinction between a limited core curriculum and a differential curriculum. This can be used as a source of enrichment, additional subjects, vocational training, or simply to extend the learning time of the core curriculum.

- Teachers for primary education are trained at a higher professional level in pedagogical colleges. Teacher education faculties of higher professional institutes educate teachers for lower secondary education, usually in two subjects. Teachers in upper secondary education come from universities; most of them are qualified for only one subject, though most physics teachers are also qualified in mathematics.

As for MST, all of the subjects are to some extent introduced in primary education — that is, pupils have been practicing MST elements in the framework of the learning areas *science* (including biology) and *arithmetic and mathematics*. In addition, technology education is included in primary education in a cross-curricular approach that spans learning areas as well as primary and secondary education. Science itself is never a separate subject in Dutch education, but at most an integrated approach to biology, physics, and chemistry. It has been suggested that science subjects and technology education be merged into one new subject.

Technology as a subject for general secondary education only came into being in the early 1990s, and remained restricted to basic secondary education. As a cross-curricular theme for primary education and for upper secondary education, technology has been a learning context for science and for more society-oriented issues around science and technol-

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ogy (STS) within science curricula. Technology also offers a "reverse perspective"— that is, where science's relation to the outer world consists of observing and measuring as input for theories, technology produces new phenomena as an output of scientific knowledge.

ICT as content appears in the lower secondary education subject *Informatica*, and as an optional subject in upper secondary education. ICT as a tool finds its way into all subjects and learning areas.

More on the contents of MST education can be found in the next section and in Appendix 1.

Curricula

Changes

Secondary education in the Netherlands has traditionally been a discipline-oriented, compartmentalized education. The subject contents could well be described as diluted forms of academic contents with little practical relevance and few possibilities for students to relate school knowledge to real life experiences. In the 1970s the pedagogical concerns of teachers and educational researchers sparked reforms on a project scale, mostly connected to specific subjects. Gradually, higher and vocational education and training supported this *élan*, articulating complaints about the inflexibility of students and poor mastery of learning skills. Thus, support for major changes arose.

These changes show that the intended curriculum, as expressed in examination programs, attainment targets and core goals, does not automatically coincide with the implemented curriculum, let alone with what students actually learn — i.e., the realized curriculum. Now, more attention is given to the fact that curriculum prescriptions should leave room for or even stimulate students' development of skills in research and in conscious and reflected learning.

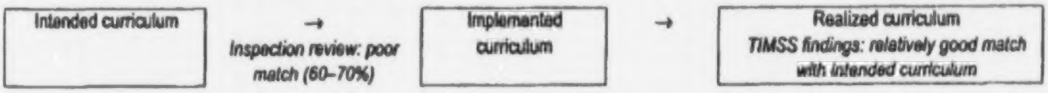
Curriculum levels

An investigation of the Netherlands Inspectorate (see Frans Rameckers's contribution to this conference) reveals that, in lower secondary education, the textbooks cover the prescribed topics to a large extent. The same is true for upper secondary education. It appears, however, that MST teachers are not able to organize all prescribed content into their education. This means that there is a net gap between intended and implemented curriculum (Figure 3). In science subjects, this gap appears to be bigger than in mathematics or in technology education. The TIMSS studies report that Dutch students generally perform well in mathematics and science — although their results are not so outstanding when compared to students from only OECD countries.

Contents

The content of MST curricula listed in Appendix 1 shows that much of the content prescribed is repeated in a way throughout the years, especially for those who continue into upper secondary education. This reflects the *longitudinal coherence* aimed at within the different subjects. *Transversal coherence*, i.e., coherence between the different subjects, is

Figure 3 Curriculum levels in Dutch MST education, with indications of the amount to which they match up


Intended curriculum
→
Inspection review: poor match (60–70%)
Implemented curriculum
→
Realized curriculum
TIMSS findings: relatively good match with intended curriculum

See also Bos e.a., 1999 and Kuiper e.a., 2001.

elaborated in various attainment targets. This is done mainly by putting stress on skills acquisition in all programs — these skills are specified when needed in terms of subject related skills. Also, some attainment targets were formulated around similar domains — e.g., "nature and environment" in the basic education subjects biology, physics and chemistry, technology, and "matter, energy and information" in technology, physics and chemistry.

The descriptions at the level of standards — but even more so in their elaborations in textbooks and teaching practice — show an orientation in *contexts*. This means that subject matter is introduced and practiced in the framework of real life issues. In many cases these issues are taken from what the students know from their own everyday life (e.g., personal health, consumer issues). But also social (e.g., medical or agricultural) or professional science and technology (e.g., power plants, industrial chemistry) contexts are used in this way.

The role of STS (science, technology and society education) — later to become STES by adding environmental education — was already mentioned. STES gained status as a legitimizer of several MST issues, and as another source of motivating contexts.

ICT

The application of modern information and communication technology (ICT) in the field of MSTE can include:

- A subject or course with ICT as contents: *Computer Science*
- ICT as a specific learning environment for MSTE
- ICT as a communication environment (e-mail, Internet)
- ICT as a collection of tools, e.g., word processing
- ICT as a way to come from "ordinary" reading to multimedia reading.

Appendix 1 discusses the first role of ICT as content, where some subject contents are listed. Appendix 2 elaborates on the second role, based on a brief reflection on the nature of mathematics, science, and technology. This paper does not describe the other roles of ICT, which find their places in niches throughout the curricula (obviously not just MST curricula) linked to students' skills, individual and collaborative, acquisition, and processing and reporting of knowledge.

Pedagogical approach

Constructivism

The context approach mentioned above was inspired in the 1970s and 1980s — when many MST innovations originated — by the need to raise students' attention and motivation. Soon, developments in learning psychology and epistemology, acknowledging the nature of knowledge as a mental construction, supported this approach. Correspondingly, learning was seen as a process of construction of knowledge rather than as receiving knowledge. In this development of *educational constructivism,* Dutch educational innovations closely followed the trends in the Anglo-Saxon community. In this view, education is basically seen as a *transaction* rather than a *transmission* process.

Problem-posing approach

Meanwhile, criticism has grown concerning educational constructivism, especially in science education. Its Achilles' heel appears to be the establishment and valuation of students' initial knowledge, and the way they describe this knowledge in terms that are obviously not taken from "official science." In the Netherlands, some researchers have started to develop and field test approaches that, while accepting students' initial phrasing of their knowledge, try to foster their learning by "trapping" students in questions, such as decision-making assignments to find out what is known about issues. The approach is referred to as a *problem-posing approach* to science teaching.

Technology education: learning by designing

"Learning by designing" is related to the problem-posing approach in the sense that students must solve practical problems, real or fictitious. The systems designed can be technical (a device, a robot) or a natural system (a system for an organism to regulate its functions, health, and immunity). If called for, scientific research may arise in this approach — or it may be imitated by asking students to re-engineer an existing system. Such approaches may be more effective than traditional methods for driving disinterested students to do some scientific and mathematical research.

Competencies based

Not specific to MST, but still influential and powerful in the context of Dutch education is the emphasis on competency-based learning. This emphasis was developed in the 1990s, partly on the waves of the constructivist approaches; but, to a large extent it was also inspired by the growing acknowledgment of *lifelong learning* in the knowledge-intensive societies that OECD countries had become.

This orientation is evident in the examination programs, where many different skills are listed as educational standards. More significantly, it can be seen in the so-called preamble to the core curriculum for basic secondary education and examination programs. A prominent direction of Dutch education policy developments is best reflected in the *characteristics and key changes* as stated in the preamble (Box 1). The stress on skills or competencies is very influential in practice — it legitimates a further shift from rote learning of fragmented fields of knowledge towards strategic ways of learning more coherent content areas. This is not to say that this shift has been accomplished, or that it takes place without problems. The "study house" approach, for example, in upper secondary education — which asks schools and teachers to allow students more input into their study planning — causes a lot of uncertainty and extra work. But the teaching and learning approaches of the past thirty years in the Netherlands, backed by the results of research and school projects, have more room to be implemented in mainstream practice than was the case before the new legislation.

This competency orientation is now a major part of teacher education curricula as well. The teacher training college in Amsterdam — the Education Faculty of Amsterdam — has even made this approach the core of its curriculum design.[3]

Box 1 Key characteristics and changes as stated in core curriculum and examination program preambles

Characteristics

1. A broad personal and social development of pupils
2. An active and independent role of students
3. The ability of the school and the teachers to deal with differences between pupils

Key changes

1. Competency-directed learning, elaborated into: learning to carry out assignments, learning to learn, learning to communicate, learning to reflect
2. Supervised learning
3. Differentiated learning
4. Coherent learning

Assessment

In primary and lower secondary education, the role of assessment is focused on feedback to learners and teachers, and on assessment of the system's quality as a whole. At the end of primary education, all children take a test that is the basis for advice about further careers in the system. This test does influence education in the eighth group (grade 8, the border between primary and secondary education), but to a limited extent.

The examinations of prevocational and upper secondary education influence classroom practice much more than tests in primary and basic education. "Teaching for the test" strongly determines the contents of the last two grades in each of these edu-

Table 1 Appearances of curricula (after: Boersma & Looy, 1996)

Appearance	Description	Actors
1–The ideal curriculum	The ideal curriculum	Politicians, researchers, curriculum developers
2–The intended curriculum	The curriculum in documents	Curriculum developers, authors
3–The interpreted curriculum	The written curriculum as interpreted by teachers	Teachers
4–The implemented curriculum	The curriculum as prepared by the teachers to be executed	Teachers
5–The executed curriculum	The curriculum as put into practice by the teachers and learners	Teachers, learners
6–The experienced curriculum	The curriculum as perceived by teachers and learners	Teachers, learners
7–The assessed curriculum	Part of the curriculum that is assessed	Teachers, learners
8–The learned curriculum	That what learners have learned from the executed curriculum	Learners

What is assessed and what is learned are both addressed as "realized curriculum" (see Fig. 3).

cation sectors. In the Netherlands, experience teaches that, with an examination-driven system, no serious educational change can take place without developments in the contents and nature of examinations.

Research and school-based curriculum development

Typical of Dutch MST education is the attention given to research-based innovations — the development of content-related, domain-specific pedagogical approaches whose success is constantly evaluated. These approaches are based on the conceptual structure of the subjects, but at the same time on the cognitive development possibilities of the learners.

Curricula can be developed from various perspectives, which do not necessarily exclude each other, including:

- The subject's logical and conceptual structure
- Constraints and possibilities of learners' cognitive development
- Manageability and ownership at the level of teachers and schools.

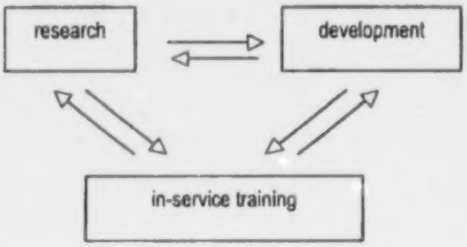
The first perspective needs the involvement of professional scientists, i.e., MST researchers. The second requires psychologists and professional MST education researchers. Their efforts appear as "ideal curriculum" and "intended curriculum" (Table 1). The third perspective reflects the growing influence of school-based curriculum development, where teachers change roles from mere executors of curricula invented elsewhere into creators of their own programs. In terms of the curriculum actors in Table 1, teachers here combine their executive role with those of developers.

When perspectives are combined, a strong and productive cycle of research and development originates that includes both the teaching and the learning activities in the education system.

This combination has been increasingly applied for more than twenty-five years in Dutch MST curriculum innovation. Groups have not restricted their work to desktop design of new or modernized contents and methods, but have also run programs in schools with large amounts of pilot teachers.

Where research became largely development based, much development activity in its turn has only become successful and able to be evaluated because of serious in-service training. In MST, more than in other Dutch school subjects, there has always been a strong cycle of research, development, and the continuous learning of practicing teachers (Figure 4).

Figure 4 A research-based innovation cycle



This cycle can be addressed in various ways: innovation cycle, action-reflection cycle (see Schön, 1983), action research, implementation cycle. Each name stresses a specific function or methodology.

The connection between innovation activities has always involved many stakeholders: teachers, teacher trainers, curriculum developers, researchers, and textbook and software authors.

It should be noted that there have always been differences in innovation between the MST subjects — in the case of mathematics education, completely new fields of contents have entered education, and have been adopted surprisingly well by the community of mathematics teachers. In the science subjects, however, changes have been more limited. But together, the MST innovations seem to have been much more rigorous and effective than those in other fields.

A word about exchange of research outcomes: Professional magazines are practice-oriented, and there is little exchange of research findings at the academic level in Dutch-language magazines — in fact, there is only one academic MST magazine in Dutch. However, Dutch researchers and developers in the field of MST education read and publish in English language scientific magazines; and Dutch researchers attend conferences that are either international, or Dutch with a much broader scope than just MST (the most prominent one being the biennial Netherlands Educational Research Days).

Communities of practitioners

Secondary school teachers in MST subjects are to a large extent connected to professional organizations, especially the teachers in upper secondary education. These organizations, together with the national organizations for pedagogical curriculum, support or organize annual meetings at which colleagues meet, exchange experiences, follow workshops, and attend research presentations. In addition, a significant number of the teachers read professional magazines. This high degree of organization, though not specific to the MST subjects in the Netherlands, has always facilitated the involvement of Dutch MST teachers in the innovation cycles as sketched in Figure 4.

Quality of schools and teacher training institutes

So far, this paper has focused on aspects of the Dutch education system that are mainly at the input side: the curricula and their innovation. However, with the teachers' professional role, which was already mentioned as a vital element in the innovation cycle, we have already entered the realm of school and, similarly, teacher education quality. It is easy to interpret quality as the performance and effectiveness of the system. And especially within the framework of interpreting good TIMSS performances, the question may arise: how are schools and teacher education institutes organized to produce good results?

Discussions about quality that focus merely on subject-related performances tend to die quickly in all countries. This is because of the complexity of schools and the recognition that students learn a lot outside of or independent from school. It is also because schools must offer more than purely cognitively stimulating environments.

In focusing on quality development, it is good to ask questions such as: what goals do we have? how do they relate to official standards? how do we establish and maintain strategic and operational improvements?

The following list offers possible items for attention. It is derived from documents used by Dutch schools and teacher education institutes. Many more detailed criteria and indicators can be formulated for other purposes.

Goals and targets

- What goals does the school or institute have regarding the students?
- How are these goals operationalized in attainment targets?
- How are these goals elaborated at pedagogical, organizational, and technical levels?
- What attainment targets are set by national or international measures?
- What sources are used for benchmarking ?

Teaching / learning and assessment environment

Formal parts

- Are programs available?
- Is there consensus about programs among the staff?
- Is there consensus about the competencies of staff?
- Is there consensus about the pedagogical concept of the school or institute?
- Is there consensus about curriculum approaches?
- Is there consensus about the ratio of contact hours, independent study hours, and time for other learning occasions?
- Is there consensus about the relation between curricula and assessment (emphasis, timing, responsible staff)?
- Are tests available?
- Are validated assessment instruments available when needed ?
- Do students have enough time to meet the requirements?
- Is there a student monitoring system?
- Is there enough variety in learning options for the students to compose their own set of choices (within official constraints)?

Personnel

- Are all teachers qualified?
- Do teachers have further training possibilities?

Facilities

- Are enough learning environments available — e.g., library, new media library, ICT provisions, laboratory facilities, fieldwork facilities etc.?

Communication

- Do students have clarity about judgment criteria?
- Do students have clarity about the curricula?
- Do students have clarity about the organization of assessment?
- Is mentor support available for students?

Relation to educational and professional environment

- Has the connection to preceding and subsequent education or training arrangements been taken into account?
- Has the connection to the demands of the labor market been taken into account?
- Have the school's attainment targets been validated by external partners?

We concluded our contribution with a brief description of some quality indicators that obviously go beyond the limits of MST education. In search of ways to find more attractive, efficient and effective ways of learning mathematics, science and technology, these general aspects of school and teacher quality cannot be avoided. Frans Rameckers' contribution to this workshop elaborates the quality issue in more detail.

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1 MST = mathematics, science and technology, including ICT.

2 See also www.minocw.nl.

3 See www.efa.nl.

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Appendix 1

Overview of Curriculum Elements in Dutch Secondary Mathematics, Science, and Technology Education

I. Basic secondary education

General attainment targets

1. Cross-disciplinary themes
2. Learning to do (skills)
3. Learning to learn
4. Learning to communicate
5. Learning to reflect upon the learning process
6. Learning to reflect upon the future

Mathematics

A. Skills
- information skills
- research skills
- technical instrumental skills
- orientation on study and profession

B. Functions and graphs
C. Discrete analysis
D. Geometry
E. Combinatorics and probability
B*. Differential calculus
C.* Discrete dynamic models
D.* Linear programming
E.* Graphs and matrices
F.* Statistics and probability

Physics

A. Skills
B. Electricity and magnetism
C. Mechanics
D. Theory of heat
E. Waves and radiation
F. Modern physics

Biology

A. Skills
B. Structures
C. Life Cycle
D. Metabolism
E. Dynamics and homeostasis

Chemistry

A. Skills
B. Matter, structure and bond
C. Carbon chemistry
D. Biochemistry
E. Characteristics of reactions
F. Chemical technology
G. Acids and bases
H. Redox

General natural sciences

A. Skills
B. Science, technology & the role of humans
C Life
D. Biosphere
E. Matter
F. Solar system and universe

II. Prevocational education

Mathematics (120 – 160 hours)

Basic skills
- independent learning
- ICT
- Dutch language
- elementary arithmetic skills

Learning skills

Algebra skills
- tables, graphics, formulas

Calculate, measure, estimate

Geometry

Information processing, statistics

Mathematical activities integrated in other fields

Physics and chemistry 1 (120 – 160 hours)

Basic skills
- independent learning
- ICT
- Dutch language
- elementary skills in handling apparatus

Learning skills
- Strategic competencies that contribute to the development of the learning capacity

Matter and materials in the house

Electrical energy in the house

Combustion and heating

Light and image

Sound

Force and safety

Structure of matter

Radiation and radiation protection

Weather

*Safety in traffic

*Constructions

*Acquisition and processing of information

*Skills in coherence

Biology (120 – 160 hours)

Orientation on learning and working

Basic skills
- independent learning and working
- ICT
- Dutch language
- elementary skills in handling apparatus
- elementary arithmetic skills
- dealing with verbal and numeric information
- in a working situation dealing with oneself and others

Learning skills
- Strategic competencies that contribute to the development of the learning capacity

Cells

Fungi and bacteria

Plants and animals in their environment

Humans influence their environment

Position, movement and condition

Sustaining the body: nutrition, energy transport and excretion

Protection, health, prevention

Perception and reaction

From generation to generation

Heredity and evolution

*Protection and antibodies

*Behavior

*Acquisition and processing of information

*Skills in coherence

*) = for students in the theory focused stream

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III. Upper secondary education

Mathematics (400 lessons)

Fields

- A: Arithmetic, measurement and estimation
- B: Algebraic relations
- C: Geometry
- D: Information processing and statistics

Physics and chemistry (200 lessons)

Fields

- A: Physics and chemistry skills
- B: Substances and materials at home
- C: Electricity in and around the home
- D: Combustion and heating
- E: Light
- F: Sound
- G: Forces
- H: Substances and chemical reactions
- I: Nature and the environment

Biology (120 lessons)

Fields

- A: Biological skills
- B: Humankind
- C: Plants and animals
- D: Nature and the environment
- E: Heredity and evolution

Information technology (20 lessons)

Fields

- A: Data processing and communication
- B: Data processing systems
- C: Applications
- D: Social significance

Technology (180 lessons)

Fields

- A: Technology and society
    - *Daily life*
    - *Commerce and industry*
    - *Occupations*
    - *The environment*
- B: Technical products and systems
    - *Materials*
    - *Energy*
    - *Information*
- C: Product design and construction
    - *Problem-solving*
    - *Design*
    - *Construction*
    - *Use and improvement*

Appendix 2

ICT as a Learning Environment for Mathematics, Science and Technology Education

ICT can serve secondary school students' learning as well as student-teachers' learning. The studied phenomena chosen may be more complex for teacher students, but a more important difference lies in the extent to which one reflects on the process as a whole. This reflective part is essential in a constructivist approach.

We first describe ICT as a learning environment (a term to be preferred over "educational software," since it combines software, hardware, and a setting in which these are used) in abstract terms for science, for mathematics, and for technology. We then give examples from our own experience.

ICT as a specific learning environment for *science education* encompasses the empirical cycle:

- Classroom measurements of a wide variety of parameters are made much easier by the use of sensors and multi-sensor computer interfaces; or by video measurements
- Outdoor measurements and data storing are facilitated by using sensors and data-loggers
- Expensive or risky lab experiments are increasingly accessible through *remote lab* arrangements
- Data can also be collected through the Internet from external sources
- Processing data
- Modeling relations into mathematical representations
- Formulating hypotheses, predicting phenomena, testing hypotheses and models.

All steps are not to be performed entirely in each case, but can be practiced in stages. ICT application supports accuracy, speeds up many of these steps, facilitates communication between learners, and thus creates time to focus on the "empirical cycle" as a whole.

Measured data can, of course, be replaced by *simulated phenomena,* produced by a model that has to be reconstructed by learners from the simulation-based data. Simulations can also be used for "designing phenomena" that can otherwise not be created or studied in a school context, but that are still needed to test hypotheses (e.g., "What happens if I change pressure, or temperature, or number of particles?")

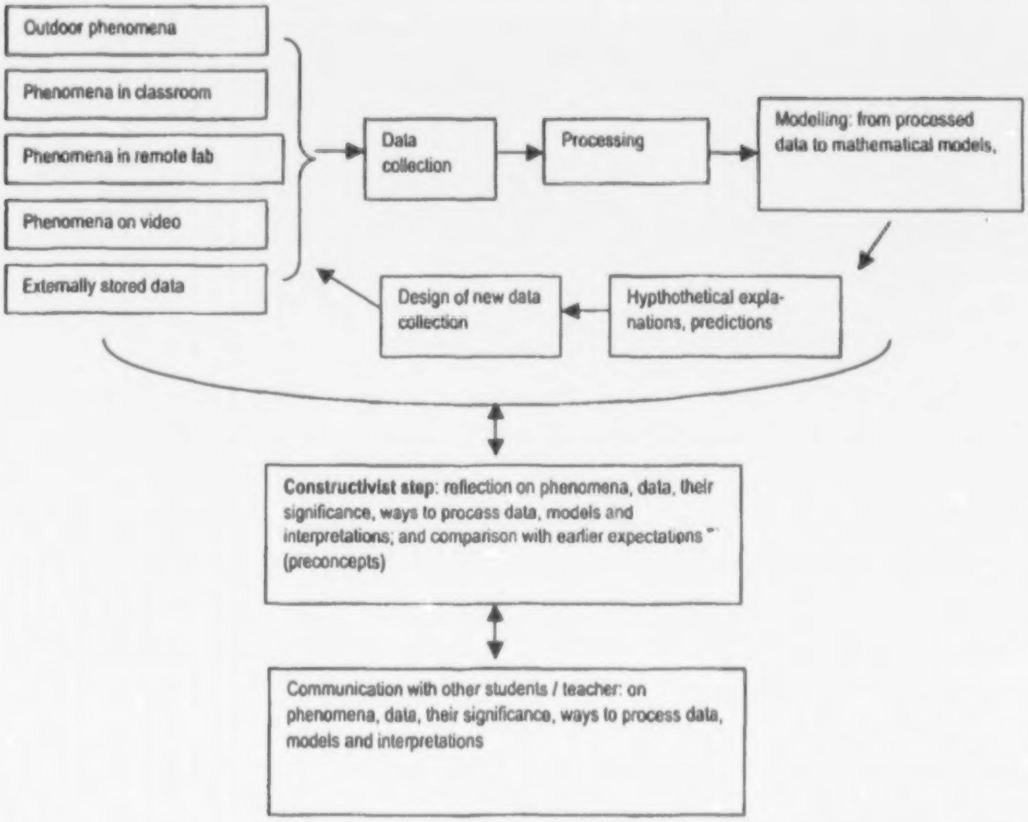
Mathematics can be practiced in this framework within the context of modeling.

In *technology education,* ICT brings design and steering of phenomena within students' reach.

In this MST-specific way (the empirical cycle in combination with designing and steering), ICT is able to disclose more realistic contexts to serious MST education.

Some examples:

- In primary school, children can discover with a light sensor that artificial light sources flash very quickly, which can make bees very dizzy.
- In lower secondary technology education, a design team designs a robot that can remove as many cans as possible from a circle. They use software for manually steering models and for reading


Outdoor phenomena
Phenomena in classroom
Phenomena in remote lab
Phenomena on video
Externally stored data
Data collection
Processing
Modelling: from processed data to mathematical models,
Hypthothetical explanations, predictions
Design of new data collection
Constructivist step: reflection on phenomena, data, their significance, ways to process data, models and interpretations; and comparison with earlier expectations (preconcepts)
Communication with other students / teacher: on phenomena, data, their significance, ways to process data, models and interpretations

sensors; they learn how to write programs and make driver programs for robots, and how to download these into robots.

- In upper secondary biology education, students investigate how the heart works by measuring the heart rhythm with an ECG-kit. They measure the blood flow through the ear with an ear-clip sensor and the opening and closing of the heart valves with a sound sensor. Study of the data gives insight into the relation between heart muscle contraction, valve movement, and blood flow through the body.
- In upper secondary physics education, students use prerecorded video clips — or, if possible, make these themselves with a digital camera — to analyze images of movements (in sport or traffic etc.). They use software to draw graphs (of place, velocity, acceleration), to deduce characteristics of the movements from these graphs, and to compare these with predictions from model calculations.
- In chemistry lessons, the effect of rain samples on soil pH is measured over time.
- In mathematics lessons, students use digital photos to investigate which mathematical functions describe chain lines (necklaces, bridges) best.

6

Effective Monitoring of the Quality of Education

Towards a managerial and participatory approach

Frans J.M.A. Rameckers

The need for effective evaluation criteria and instruments

We do not organize a regional workshop on the Renewal of Secondary Education in Africa to convince each other of the basic conditions needed for secondary education — namely, appropriate school buildings and ample classrooms, qualified teachers, good teaching and learning materials, reasonable student/teacher ratios, a functioning education assessment system, capable school management, and relevant national school curricula for various levels of education. All experts attending this workshop will quickly agree on these basic conditions for good education.

For us, the *quality of the teaching-learning process* — what is happening within the classroom — is more important. And this focus on the quality of the educational process must shift from *creating basic conditions* for education to *monitoring* the quality of the process.

There is another reason for focusing on quality. In many education reform and school innovation projects, much attention is already given to "conditionalities." And in many Southern countries, there are good reasons for investing a lot in these *infrastructure* conditions. But sometimes a better reason for focusing on infrastructure is that the outcomes of these kinds of interventions are clearly measurable. Output indicators for this aspect are easily determined: numbers of classrooms built, textbooks delivered, and teachers (re)trained.

Focusing on the quality of the *pedagogical practice* and its impact on the quality of education requires a more sophisticated approach for developing methods, instruments, and criteria of ranking outputs.

Analyzing the quality of pedagogical practice brings about the recognition of both *output performance indicators* (e.g., dropout rates, intake and outflow numbers, gender figures, test and examination results) and *input indicators* (e.g., efficiency of the school system, government expenses per pupil/school type, quality reports). One problem of these output performance indicators is that they hinder clear judgments on the quality of the pedagogical

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process — that is, good results on decreasing dropout rates may indicate a good quality pedagogical process, but may be influenced by many other aspects. In other words, this "universal" hesitancy to pay attention to the pedagogical process seems to be caused by the lack of clear criteria and tools for *quantifying and qualifying* this aspect.

The search for these criteria and tools is the basis for this paper: First, I present some basic thoughts on the *concept of quality*. Then the paper describes *three international examples* of developing and implementing methods, criteria, and tools for monitoring the quality of the pedagogical process in classroom practice. Finally, I invite the workshop participants to reflect on the added value of these examples, in view of their own quality concepts, and with respect to their own national state-of-the-art in regard to quality issues. That reflection may support the development of broad, custom-made quality approaches for secondary education in the African countries participating in this workshop.

Some thoughts on the concept of "quality of education"

Quality of education may be one of the most widely used trendy phrases in education reform and innovation across the world. This paper does not intend to describe the many theories and concepts of the quality dimension of education; besides, many of these concepts are closely related to the context of the national education system, cultural and economic circumstances, and the development stage of the country.

During my supervision and evaluation work in the education sector, I have learned that many education experts are searching for clear quality criteria for school *accountability*. The aspect of accountability refers to both macro and micro responsibility of schools: macro accountability to (local) governments, and micro accountability to their "consumers" (parents, students, community).

Three main components of quality of education

Accessibility comprises three basic components and their key factors:
(i) *Access:* school infrastructure, classrooms and their use, and availability of qualified teaching staff;
(ii) *Enrollment:* distance between home and school, appropriate school design, user costs, school-community relations, access to subsequent levels of education;
(iii) *Equity:* geographical distribution of schools, instructional materials, gender aspects of school design, and language of instruction.

***Effectiveness** comprises four basic components and their key factors:*
(i) *Teacher quality*: professional competence of teachers, academic ability, teacher training system, in-service development, teacher motivation, working conditions, teaching methodologies and teaching guides, expectations of student performance, student-teacher ratio;
(ii) *Instructional materials*: provision and quality of textbooks;
(iii) *Learning environment*: physical classroom environment (including teacher meeting rooms, latrines, water and electricity);
(iv) *Supervision*: advisory, supervisory and inspectorate system, provisions for parents and community participation;
(v) *Effectiveness/relevance:* design and scheduling of courses, curricula and assessment, feedback mechanisms on external needs, gender/cultural/geographical aspects of curricula, examinations, and teaching approaches, pass and dropout rates, post-instruction employment rate, school completion time, etc.;

***Efficiency** comprises a mix of five basic components:*
(i) *School management*: management skills and competence, planning and information systems;
(ii) *Appropriate mix of inputs*: balancing provision of teachers and classroom materials, volume and quality of equipment;
(iii) *Allocation and use of physical and teaching facilities*: planning and (community) use of classroom and other school facilities (e.g., library and computers), class-contact time, and class size;
(iv) *Supply services*: adequate use of private sector support;
(v) *Use of new technology*: learning process, management information, distance education, etc.

I would like to present a simple, overall concept of quality of education. The concept is based upon the assumption that grassroots education practitioners prefer simple definitions directly applicable to their work.

Quality equals accessibility, plus effectiveness, plus efficiency. This concept also reflects the generally recognized causes of low quality performance of a national education system.[1] These causes encompass the same three components: accessibility, effectiveness, and efficiency of the system.

Almost all education reform or innovation projects include "quality" components within their objectives. However, in many of these projects, particularly in Southern countries that badly need basic infrastructure investments in education, the focus is on the first component — accessibility. Often, only partial attention is given to a few elements of the other two components — provision of textbooks and teacher training. In this paper, therefore, I tried to collect *three international examples* of attempts to develop broad quality concepts that include almost all of the quality components mentioned.

The first example is a large international (European) attempt to agree on a limited number of indicators or benchmarks for school standards in order to assist national evaluation of secondary education systems. The second example describes the development and implementation of an in-depth monitoring and evaluation system at the national (Dutch) level. The third example presents a practical and participatory approach for monitoring and evaluating quality aspects in the education sector of Southern countries.

Introduction of the "European Report on Quality of School Education"[2]

All EU states place a high political priority on the quality of secondary education and training. High levels of knowledge, competencies, and skills are considered the basic conditions for active citizenship, employment, and social cohesion. Lifelong learning is an important means of shaping one's future on a professional and personal level, and high-quality education is essential to labor market policies as well as the free movement of workers within the European Union. The European Commission (EC) Treaty states that the EU shall contribute to the development of quality education by encouraging cooperation between member states.

The Education Council (consisting of the education ministers of all EU member states) has often debated this subject, and numerous conclusions and resolutions have been adopted, inviting member states and the EC to cooperate in this field. In November 1999 the council identified quality of education as a priority issue for consideration. In addition, under the EU action program, *Socrates*, one of the key objectives is quality of education.

Quality of education has thus been a priority issue for analysis, and a number of studies and research projects have been launched to strengthen cooperation at the European level. These initiatives have paved the way for the pilot project on quality evaluation in school education, which was implemented in 101 secondary schools across Europe in 1997/98. Based on the results of that pilot, the EC adopted in 2000 a proposal for a recommendation on "European cooperation in quality evaluation in school education." The need for cooperation in the field of quality evaluation was equally underlined at a conference (Prague 1998) of the Education Ministers of the EU and of the eleven acceding countries, as well of the three non-associated countries of Central and Eastern Europe participating as observers. The Education Ministers from these twenty-six countries invited the EC to establish a working committee of national experts designated by the ministers to agree on a "limited number of indicators or benchmarks for school standards to assist national evaluation of systems." A working group of experts from the twenty-six European countries was subsequently set up in 1999,[3] and the EC prepared two progress reports. The first report, con-

Four areas of indicating the quality of education

1. ***Attainment.*** There are seven indicators of attainment critical for all European countries. In some fields — mathematics, reading, science — data already exist. To some degree, this reflects the relative ease of measurement in these areas. At the other end of the spectrum, "learning to learn" is an indicator covering a much less easily measurable set of skills, but nonetheless critical for an unpredictable social and economic future, where no comparable data is now available. In between are subjects such as "civics," for which little data exists, and "foreign languages," which also has yet to be developed. "Information and communication technology" (ICT) is also included because, although little good data now exists, it will be a key indicator in years to come. All of these areas of attainment remain important goals for the future.
2. ***Success and transition.*** Into this area fall three indicators of highly significant policy relevance. They are closely interrelated: "dropout rate from school," "completion of upper secondary education," and "participation in tertiary education."
3. ***Monitoring of school education.*** Two indicators fall into this area. These are "evaluation and steering of school education" and "parental participation." Both are concerned with stakeholder participation where heads of schools, teachers, students and parents are key stakeholders, consumers of information and active players in school improvement.
4. ***Resources and structures.*** This category includes four indicators, each concerned with key aspects of infrastructure which underpin school performance and pupil success. These are "educational expenditure per student," "education and training of teachers," "participation rates in pre-primary education" and "number of students per computer."

taining the basic criteria for the selection of indicators, was presented to the European Ministers of Education in Budapest in June 1999. The second report, setting out a preliminary outline of the indicators to be considered, was submitted to the Education Council in November 1999.[4]

The resulting publication "European Report on the Quality of School Education" is based on the sixteen indicators selected by the working group in cooperation with the EC. These indicators on quality of school education provide a complementary set of information that begins to detail quality in European schools.

The sixteen indicators cover *four broad areas*: (a) attainment levels, (b) educational success and transition, (c) monitoring of school education, and (d) educational resources and structures. The EC submitted the report in May 2000, which constitutes a key element of the "rolling agenda" of the Education Council in the field of quality of education. The EC's intention is to update and to complement the selected indicators on a regular basis.

Overview of the sixteen indicators — European Report on Quality of School Education, May 2000

Area	Indicator[5]
Attainment	1. Mathematics
	2. Reading
	3. Science
	4. Information and communication technologies (ICT)
	5. Foreign languages
	6. Learning to learn
	7. Civics
Success and transition	8. Dropout
	9. Completion of upper secondary education
	10. Participation in tertiary education
Monitoring of school education	11. Evaluation and steering of school education
	12. Parental participation
Resources and structures	13. Education and training of teachers
	14. Participation in pre-primary education
	15. Number of students per computer
	16. Educational expenditure per student

The European Report on the Quality of School Education represents the EC's first response to the conclusions of the special European Council meeting in March 2000. At this meeting the EU set itself the strategic target of becoming the most competitive economy in the world capable of sustainable growth, with more high-quality jobs and greater social cohesion. Achieving this goal requires an overall strategy aimed at preparing the development of the knowledge-based economy and a strategy designed to modernize the European social model by investing in people and by combating social exclusion. At the core of this strategic reorientation of priorities, the conclusions of the Lisbon European Summit (March 2000) recognized the essential role of education and training in moving towards the goal of full employment through the development of the knowledge economy.

The European Council clearly identifies the need to set quantifiable targets, indicators, and benchmarks as a means of comparing best practice, and as instruments for monitoring and reviewing progress. The EC is convinced that this first European report on the quality of school education will contribute a European dimension to the shared knowledge pool available for educational policymaking. The EC hopes that the report will foster cooperation across Europe and stimulate a wide-ranging debate among all stakeholders on quality policies of education.

Indicators and benchmarks in policy-making

It is through graphical portrayal of similarities and differences between countries that indicators and benchmarks come into their own. This allows countries to learn from one another through comparison of both common interests and differences. The aim of benchmarks is not to set standards or targets, but rather to provide policymakers with reference points. Benchmarks are used to identify issues that need to be investigated, and to suggest alternative routes to policy goals.

Five challenges to quality of education in Europe

The report states that "the new millennium may be only a symbolic change of date but it marks an important stage for policymakers in European countries. It encourages us to look to the future and turn our attention to the challenges which that future presents. For policymakers, the challenge will be to stay in touch with, and ahead of, national and transnational movements which will change the face of Europe and impact on national systems of education. The sixteenindicators presented in the report lead us to identify five key challenges for the future:

- The knowledge challenge
- The challenge of decentralization
- The resource challenge
- The challenge of social inclusion
- The challenge of data and comparability."

The indicators lead to different policy areas and to promising practices that already exist within Europe. Within each of the indicator areas, examples of such practices are illustrated in the report. Indicators lead to benchmarks, to issues and questions, and thence to examples of practice that provide a focus for policy development in every European country. The result is a presentation of interesting examples from across Europe that stimulates discussion and illustrates principles that may be transferable. Some examples of practice go well beyond the parameters of the associated indicator, but in doing so illustrate the potential of the data to make a difference both at the policy level and in school or classroom practice.

Recent large-scale evaluation of secondary education in the Netherlands

Over the last decade secondary education in the Netherlands has been reformed drastically. In this section we will introduce two large-scale evaluations of these reforms in Dutch secondary education. To understand the scope of the evaluations, we first introduce these two important reforms.

Recent reforms in secondary education in the Netherlands

Reform of lower secondary education

On 1 August 1993 a renewed type of lower secondary education was introduced in the Netherlands: *basic secondary education* (*basisvorming*), which entailed a modernization and harmonization of education in lower secondary education. This innovation was intended to raise the level of young people's education and allow them to postpone the choice of studies and career. Its overall goal was to create "a common and general education in the intellectual, cultural, and social fields that form the basis for further development of the personality, for a meaningful functioning as a member of society and for a well-founded choice for further education and professional career." This goal illustrated new international developments and trends in secondary education, characterized by a clear shift from scientific-oriented curricula towards more real life teaching and learning.

The main innovations of this new basic secondary education were:

- A new core curriculum consisting of three elements: (a) a list of subjects, (b) a recommended timetable, and (c) fifteen sets of attainment targets for all pupils.
- The attainment targets are laid down by law (Secondary Education Act, 1992) for all subjects. They will be evaluated and adapted every five years.
- These attainment targets were also aimed at improving the interface between primary and secondary education.
- The new curriculum would cover a period of three years, but subjects can be completed after two or four years.
- The recommended timetable (instead of the previous compulsory one) was supposed to give schools more freedom in organizing their education.
- The government ensured that final tests for subject components were developed and made available.

Upper secondary education: the profiles

Until 1999 students were free to pick a set of school subjects out of all possible subjects — only Dutch language and one foreign language are compulsory; in the new situation the options are more limited.

The new curriculum for upper secondary now has been organized in four so-called profiles (transfer sets):

- *Science and technology*, stressing natural sciences and mathematics
- *Nature and health care*, stressing natural and life sciences
- *Economics and society*, stressing economics and (in the pre-university stream) mathematics
- *Culture and society*, stressing languages and humanities.

Reform of upper secondary education[6]

The developments in upper secondary were partly influenced by the reform of lower secondary education, and partly strengthened by a desire of the tertiary education field that students be trained in learning skills rather than in a large amount of facts, figures, and laws. A new curriculum was designed stressing student participation and responsibility. This new design, called the *Study House* was formally introduced in 1999/2000. Upper secondary also showed more innovations than other levels in its organization: No longer will lessons be planned according to a prescriptive table of lessons, established at a national level for all subjects, but a number of study hours will be assigned to each school subject.

It is up to each individual school to decide how the study hours will be distributed among class lessons, working group support, and individual work at school or at home. Also, the use of a laboratory, a library, electronic media, or other facilities is left to the planning responsibility of the schools. This shift of responsibility from the national level to the school level matches a general trend towards making schools accountable for their entire process, in connection with lump sum financing. (See the section on school governance below.)

The transition to the Study House would affect the contents of school subjects. More time must be reserved for skills training, and less time can be assigned to the topics that traditionally build on the contents of subjects.

The workload of upper secondary students will be intensified. A major motive for this is the relatively disappointing connection with tertiary education, where too many first-year higher vocational and academic students stumble.

Evaluation (1996/1999) of recent reform of lower secondary education[7]

The new Secondary Education Act (1992) included an evaluation statement, which implies that the Minister of Education, Culture and Sciences will evaluate the introduction of the new curriculum of lower secondary education before 1 August 1999. The Dutch School Inspectorate implemented the evaluation, since they were supposed to be capable of independently evaluating the state of education.

The object of the evaluation was assessing and describing the quality of a number of important characteristics of the teaching-as-it-is-implemented in the school years in which basic secondary education was achieved at secondary schools. The evaluation was aimed at creating possibilities for a social and political discussion on the further development of lower secondary education.

The Inspectorate's evaluation plan consisted of a number of questions about school organizational aspects, the teaching-learning process, and pupil performances:

- Do the educational content and the format of the teaching-learning process meet the characteristics of good education?
- Is there a favorable school climate?
- Is there proper guidance for all the pupils during the first years of secondary education?
- Are the pupils prepared for the choice of studies and career?
- Are the results obtained in the first years of secondary education good?
- Is the school organization aimed at realizing the educational content, the teaching-learning process, and the results?
- Have the schools arranged a proper alignment between primary education and the first stage?
- Have the schools made arrangements to achieve a proper alignment between the teaching program in the years in which basic education is realized and teaching in the upper forms/second stage?

The school organizational aspects (school climate, school policy, provisions for pupils with special needs, and educational and vocational orientation) were evaluated in the school year 1996–1997. The teaching-learning process was dealt with in the school year 1997–1998. The results of the new curriculum, in terms of pupil performances, were evaluated by means of the final tests in 1998 and 1999.

The results of the evaluation were issued in 1999,[8] in which the nine evaluation questions were answered in the form of descriptions and assessments, also from an international perspective. In the report, the Inspectorate gave a description of the factors that may have had a positive or negative effect on the secondary school years in which basic secondary education is provided.

Evaluation of the teaching-learning process

For the Inspectorate, the evaluation of the teaching-learning process was the "heart" of the evaluation. A project group was established to develop the evaluation process, the tools and instruments, and the training of the inspectors involved. This group developed an *evaluation framework* for the evaluation of the teaching-learning process that comprised fourteen standards for good education. The standards were grouped in four basic evaluation questions: (a) consistent teaching content (supply); (b) pedagogical-didactical teaching quality (process); (c) impact of school conditions on learning; and (d) interface between primary and lower secondary. The set of standards was operationalized into eighty-seven indicators for measuring results of findings

Overview of evaluation questions and related standards of lower secondary education — Evaluation, Dutch Inspectorate 1996–1999

Evaluation question		Standards
1. Is the teaching content in basic secondary education consistent with the subject-specific attainment targets and the general skill objectives?	1.1	The actual subject matter covers the subject-specific attainment targets
	1.2	The actual subject matters covers the general skill objectives
2. Does the teacher's teaching strategy support the realization of the subject-specific attainment targets and the general skill objectives?	1.3	The teaching methodology strategy used by the teacher is in agreement with the general objective of the subject and with the other demands that are being placed on the subject
	1.4	The instructional behavior of the teacher contributes to a good teaching-learning process
	1.5	The teacher can give direct instruction and manages the class adequately and organizes the processing well
	1.6	The teacher encourages the students to take part in an active learning process
	1.7	The teacher takes the relevant differences between the students into account
	1.8	The department registers and systematically evaluates the achievements and progress of the students
	1.9	The school systematically monitors the students' achievements
3. Are the relevant school conditions conclusive to the teaching-learning process?	3.1	The school takes adequate steps to ensure the continued effect of the educational policy in the teaching-learning process
	3.2	The department implements an active policy with respect to the content and the (teaching) methods used in the approach to the subject
	3.3	The school gives the students sufficient opportunities within the school timetable to achieve the attainment targets of basic secondary education
4. Does the school pay sufficient attention to the interface between basic secondary education and primary on the one hand, and basic secondary education and the upper forms on the other hand?	3.4	The school tries to ensure a proper linking between basic secondary education and primary education
	3.5	The school ensures a proper linking between basic secondary education and the upper forms

and observations. The standards and their indicators were the basis for the development of instruments: forms of observations, discussions, and oral and written surveys. Teaching methodologists and educationalists have assessed the validity of the evaluation framework.

In order to enable the inspectors to make a sound assessment of the educational content in relation to the new attainment targets, a list was drawn up of textbooks commonly used within schools. Educational publishers were asked to have these textbooks analyzed based on criteria formulated by the Inspectorate. Other independent external experts assessed the content and instructional quality of the textbooks.

Prior to the implementation of the evaluation procedure, an in-service training course was set up for inspectors and staff. The training of inspectors consisted of general and subject-specific in-service training in order to enhance their professionalism. The staff received further information on basic secondary education and on the objectives and methods of operation, pertaining to the evaluation of the teaching-learning process.

To test the set of instruments and to check the inter-raters reliability, pairs of inspectors carried out school visits at subject level in early 1997, followed by a full tryout held at six schools in order to test the logistics of the evaluation.

Finally, the evaluation was implemented during the school year 1997–1998 at 120 schools by teams of six to ten inspectors per school. They assessed 7,300 lessons, with thousands of pupils, parents, and

Example of relationship between standards → indicators → qualifying norms

In order to register their observations and qualifications, inspectors used a set of indicators for each of the standards and norms for qualifying their observations.

Statements of norms for qualifying on the indicators
In the statements of the norm the school/teacher qualifies for one of the following categories:

1. Mainly poor
2. Poor rather than strong (poorness predominates)
3. Strong rather than poor (strength predominates)
4. Mainly strong

The qualification required for "strong rather than poor" is mentioned in each of the individual standards.

Example for standard 2.4
Standard 2.4: The teacher encourages the students to take part in an active learning process
Indicators 2.4:

1. The teacher stimulates the students to take the initiative themselves.
2. The teacher ensures that there is task-oriented interaction between students.
3. The teacher allows the students to work independently.
4. When working on tasks/assignments, the teacher stimulates the students' learning activities.
5. The students play an active part in the teaching-learning process.

For the *qualifying* norm "strong rather than poor" a positive score has to be attained on at least indicators 1 and 3 and two other indicators.

teachers involved in the evaluation activities. A test was administrated to over 63,000 pupils to determine their performance level. Scientists and inspectors processed and interpreted other data on transfer, entrance, and leaving rates.

Prior to the school visit by the inspector teams, the Inspectorate briefed the school management extensively. The preparation of the school visit itself started several weeks before the visit. Schools were asked to collect relevant data and compile a school file for the inspectors visiting the school.

Generally, data were collected at various levels. At the school level inspectors examined school documents and school work plans. At the department level they looked at department work plans, textbooks used, additional teaching and learning materials, and tests. Interviews were arranged with department teams, individual teachers, and pupils. At the class level inspectors observed lessons, using detailed observation forms.

Every school visit concluded with both an oral (at the end of the one-week school visit) and a written evaluation report (six weeks after the visit).

Continued evaluation (1999–2002) of both lower and upper secondary education[9]

The large-scale evaluation of the new basic secondary education (1996–1999) provided the Dutch inspectorate with ample experiences in assessing several domains of educational quality in secondary schools. Apart from the findings, conclusions, and recommendations of that evaluation study, the (preparation and implementation) methodology applied seemed to guarantee a careful and thorough assessment of quality issues.

Based on those experiences — as well as on new insights and the many professional and political debates about the 1999 Evaluation Report — the Dutch Inspectorate decided to develop a new evaluation framework for its Regular School Supervision (RSS). This new framework would be the basis for evaluating all secondary schools (both lower and upper level) over a period of three school years: 1999/2000–2001/2002.

Since 1998 the Inspectorate has annually published a school quality card (SQC) for each relevant school. The quality card contains the examination and transfer results that are compared with those of other schools. With the publication of these data, there was a need to relate the information on this kind of output performances of schools to other quality dimensions of education at the schools themselves. The idea was that the quality of education is not solely expressed in the learning outcomes. The RSS working method has made it possible to present a broader overview of quality dimensions, including the process of teaching and learning itself in the supervision of school performances.

At the start of school year 2000–2001 the SQC was published on the Internet. The same was done for the RSS reports of the visits (as from 1 January 2001).

Comprehensive evaluation framework for regular school supervision (RSS)

The development of a comprehensive evaluation framework for RSS of secondary education was based on piloting previous versions of RSS since 1998. The actual framework (version 2001–2002) was developed after a literature search, the previous experiences with evaluating lower secondary (as described above), and a number of scientific recommendations. Besides, the framework was tested at twenty secondary schools. Evaluation criteria, tools, and instruments have been developed and adapted in a participatory approach involving all stakeholders in the pilot phase. Various versions of the framework have been extensively discussed with experts and presented at standards conferences.

In the evaluation framework, the Inspectorate departs from the idea: *what can reasonably be expected from a school with respect to quality assurance*? A good school for secondary education is a school organization where teachers provide good education, so that pupils learn to the best of their ability and achieve good results.

In their supervision, the Inspectorate's basic question is: what is the quality of the education in light of the school's situation?

Basic situation of the school

Because schools differ in the degree to which preconditions are favorable for the quality of the education, the RSS departs from the basic situation of the school. In the RSS the following factors of the school situation include:

- *Composition of the school population* (number of pupils, recommendations of primary schools, number of ethnic minority pupils, number of pupils and parents that use subsidies to cover study costs)
- *Composition of the staff* (ages of teaching staff, qualifications, average size of job load, stability of staff and shortages, administration)
- *Accommodation of the school* (age, state and maintenance of school buildings, presence of various locations, and their relative distances)
- *School's market position* (size of the feeder area, degree to which the school is losing or attracting "better" pupils, competitive position in relation to the number of pupil enrollments and cancellations).

Inspectors examine the mentioned basic quality question by assessing thirteen quality characteristics, grouped into the following four domains:

- The school achieves *learning outcomes* (in terms of effectiveness, achievement level, efficiency).
- The *teaching-learning process* is of adequate quality (in terms of curriculum, learning time, classroom practice, teaching strategy, learning activities).
- The *student care system* supports the learning of pupils (in terms of placement, transfer, and counseling of all pupils within the school).
- The *organization and policy* of the school contribute to a satisfactory teaching-learning process, satisfactory student care, and learning outcomes (in terms of monitoring the quality of education, involvement and professionalism of staff, use of available resources, and maintenance of functional external contacts).

RSS in practice

On average, a RSS school visit lasts two days. The visiting inspectors team consists of two inspectors, and prior to the visit, the Inspectorate requests in-

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Overview of evaluation domains and related quality characteristics of regular school supervision in secondary education in the Netherlands, Dutch Inspectorate 2001–2002

Domain		Quality characteristics
1. Learning outcomes	1.1	Pupils achieve results that could be expected based upon their potential
2. Teaching-learning process	2.1	The school offers the attainment targets and the exam program as a coherent whole and to a sufficient extent
	2.2	The school offers pupils enough time to become familiar with the education offered
	2.3	The classroom practice created by teachers forms the basis for a supportive pedagogical class working climate
	2.4	The teaching strategy used by teachers forms the basis for a goal-oriented learning process
	2.5	Teachers encourage pupils to actively participate in the learning process
3. Student care system	3.1	The school properly organizes the placement, transfer, and vocational guidance of the pupils
	3.2	The school provides specific counseling for pupils that need extra assistance
4. Organization and school policy	4.1	The school monitors the quality of the education it provides and implements measures to maintain the quality and to improve it when necessary
	4.2	Schooling and (staff) team development are aimed at improving education
	4.3	The school uses the staff and material resources efficiently
	4.4	The school ensures that there is a safe and motivating school climate
	4.5	The school maintains functional external contacts

formation from the school through questionnaires. There are questionnaires for school management, counseling staff, and questionnaires for the individual subjects. In addition, an analysis is conducted of the most important policy documents of the school — namely, the work plan and the school prospectus. This prior analysis also encompasses the school's two most recent SQCs.

During the RSS school visit data collection is completed, discussions are organized with all stakeholders, and observations of lessons are conducted. Similar to the evaluation of lower secondary education, results are qualified on a four-point scale: (a) predominantly weak, (b) more weakness than strengths, (c) more strengths than weakness, and (d) predominantly strong.

The RSS report

After the school visit, a draft report is sent to the school management, allowing them to check for errors and omissions. The final report is public and is published on the Internet. The final report includes (a) a quality profile of the school (graphic overview of the assessment); (b) summarized considerations of the education quality; and (c) indications of how the Inspectorate will supervise the school in the next period, as well as instructions regarding major legal provisions.

Introduction of the school quality index (SQI)[10]

The SQI is an integrated planning, monitoring, and evaluation tool that has been developed and implemented successfully by PLAN International,[11] an NGO working in the education sector in Southern countries. Within the PLAN organization, the SQI has been introduced as one of the instruments for its corporate planning, monitoring, and evaluation (CPME) system. Since the SQI is an optional baseline instrument, it has not yet been used in all the countries where PLAN works. In PLAN's Latin American countries, the regional PLAN offices decided to make it a mandatory part of the country baselines. Therefore, in all countries in this region the SQI has been implemented on a sample of schools with which PLAN works. In addition, most of the countries in this region have applied the SQI to all the primary schools they work with, and used it as a basis to design plans of actions with each of these schools.

The purpose of the SQI is to help the key educational actors (school management, teachers, community leaders, parents) assess the conditions of their schools, select areas for improvement, and monitor and evaluate progress. The SQI is focused on the school elements closely related to quality and learning. It involves (a) an assessment of inputs, processes, and outputs of schools; (b) targeting of priority school conditions related to quality in need of improvement; (c) selection of appropriate improvement actions; and (d) elaboration of a school quality action plan with monitoring and evaluation benchmarks.

The "**SQI Guidelines for Users**" are organized in five sections:

- *Application guide*: This is the users guide.
- *Indicator description*: This section gives a detailed description of each indicator used.
- *Indicator matrix*: This is the instrument used to rank schools according to quality indicators.
- *Selection of indicators*: This describes procedures to target the priority indicators (unacceptable quality conditions) that need improvement.
- *School quality action plan*: This describes the procedures to identify causes of the quality conditions identified as unacceptable, select action alternatives, and chart a course of action with monitoring and evaluation benchmarks.

In practice, school heads, teachers, parents, and community leaders use the SQI. Teachers used the SQI to rank their school according to the list of indicators. Subsequently, teachers and school managers select indicators, and write an action plan with the participation of parents and community leaders.

The participatory process of using and implementing the SQI involves the following steps:

- Each teacher reviews the *Description of SQI Indicators* and ranks his/her school individually using the section *Indicator Matrix*. A score of 1 assigned to an indicator means that the school is in poor condition regarding that particular indicator. A score of 5 means that the school is in excellent condition regarding the indicator (see scoring criteria at the end of the indicator matrix). Teachers rank the entire school, not just their particular class.
- Teachers meet to discuss their rankings and agree on an average to be assigned to each indicator. This step is not done in schools where there is only one teacher.
- Teachers review the ranking to identify the indicators with the lowest scores.
- Teachers select all the indicators with the lowest scores (at least two for each section A to D of the matrix) and write them in a separate sheet. Indicators with a score below 3 should be listed. For schools where indicators are ranked 3 or higher, those ranked 3 would be selected.
- Teachers select eight indicators with the lowest scores. At least one indicator should be selected from each of the four areas of the indicator matrix (A to D). For this purpose, teachers use the section *Selection of Indicators*. Based on the subtotal score for the four areas (A to D), teachers may decide to give more attention to one or two areas. However, at least one indicator should be selected from each area for the set of eight.
- Teachers and administrators agree on a schedule to organize and conduct an assembly with parents and community leaders. The purpose of the assembly is to select the priority indicators to be acted upon and agree upon the improvement actions to be taken. The community (via the steering or main committee) should be invited to designate seven parents (ideally one for each grade) and seven leader representatives to participate in the assembly. Thus, up to fourteen community representatives and the teacher(s) would hold the assembly. If the school has an administrator (principal, headmaster, or teacher designated as principal), he/she should participate in the assembly. It is important to follow proper channels to invite the participants. Likewise, it is important to remind those people designated/invited to attend the assembly.

Overview of SQI areas and their related SQI indicators. PLAN CPME Guidelines

SQI Area	SQI Indicator	
1. School organization	1.1	Existence of a plan for school improvement
	1.2	Existence of norms for school operations and conduct for school staff and pupils
	1.3	Instructional leadership/support for teachers
	1.4	Cooperative work among teachers
	1.5	Existence of student organizations
	1.6	Existence of school-community committee(s)
	1.7	In-service training for teachers
	1.8	Teachers presence at the school five days per week
	1.9	Classes starting and ending on time daily
2. Physical conditions/environment	2.1	Comfortable classrooms
	2.2	Clean classrooms with attractive walls
	2.3	Space for play and recreation
	2.4	Working and clean latrines or toilets
	2.5	Working water system at school
	2.6	One good blackboard per classroom
	2.7	Bench and table or desk for every child
	2.8	Furniture that can be arranged
	2.9	Facilities are maintained
3. Children well-being	3.1	Health program for children
	3.2	Play and recreation activities during recess
	3.3	Teachers participate in play and recreation activities
	3.4	Children are treated well at school
	3.5	Teachers dialogue with children with respect
	3.6	Children respect their teachers
	3.7	School promotes the rights of children
	3.8	School promotes education for parents.
4. Classroom activities	4.1	Teachers use teaching
	4.2	Teachers combine lecturing with group and individual work
	4.3	Teachers motivate children to take initiative
	4.4	Teachers acting as facilitators
	4.5	Classroom have textbooks, work books, activity guides
	4.6	There is a library at the school
	4.7	Teachers use material that the school provides or make their own material
	4.8	Class time is used mainly for teaching/learning activities.
5. School/student performance	The criteria for this section are included as an annex to the SQI instrument itself.	

- The assembly (a) discusses the conditions of the school according to the indicators; (b) explains why the eight indicators were selected; (c) selects the priority indicators; (d) examines the causes of poor/deficient conditions reflected by the priority indicators; (e) identifies and selects actions; and (f) agrees upon and writes an action plan to improve the school. For this, teachers and community representatives use the section *School Quality Action Plan*.

Description of the SQI Indicators

The SQI indicators are grouped in five areas. The first four areas focus on (a) the quality of school organization (with emphasis on participation), (b) physical/environmental conditions, (c) children's well-being, and (d) classroom practices. The fifth area is concerned with actual testing of learners' performance. Each area has a set of indicators, and each indicator is described extensively in the SQI guidelines.

Based upon this overview of areas and indicators, a simple matrix can be designed in which all indicators are grouped and scored according to observations and/or tests. An annex to this paper contains an example of such a SQI indicator matrix. The annex also includes examples of criteria for ranking the indicators.

Example of a first elaboration of SQAP step (iii), "Identification and selection of actions"

Address now	Address over a three-year period	Cannot address effectively
Crowded and uncomfortable building	Too old and small school	Ministry assigns no resources for materials and school operating costs
Teachers not being at school every day	Teachers not having enough materials to work	Ministry assigns very low per student inputs
Children not attending school regularly	Children working and getting sick	Ministry not allowing local nomination and hiring of teachers

The SQI in school practice

As stated before, the SQI is an integrated planning, monitoring, and evaluation tool, currently being used in a *participatory* way. Although the tools and instruments have been elaborated in a detailed way, the SQI users (including all stakeholders) are invited to examine, discuss, and adapt the SQI indicators and their ranking in relation to the specific circumstances of the school.

The aim of the SQI is to help school staff and communities identify which school quality conditions merit attention, and target them for improvement. Once the conditions (summarized/reflected by the indicators) reach scores of 4 or 5, the school will have the quality conditions for student learning and school/pupil performance. Users are strongly suggested to target the conditions in a progressive way, focusing first on those with the lowest scores.

The goal of using the SQI in a participatory way is to end up with a clearly elaborated *school quality action plan* (SQAP). This SQAP ideally is being developed and implemented in a four-step approach: (a) targeting of priority indicators; (b) analyses (identifying and ordering) of causes of faults or low scores; (c) identification and selection of actions; and (d) implementing the SQAP (ordering, monitoring, and evaluation). The third step is the most interesting and difficult one. Since not all action can be implemented immediately and simultaneously, this step compels all participants to make clear priorities. One way to handle the prioritization problem is to distinguish between the urgency and/or feasibility of the actions in the short or long term.

SQI approach for secondary education?

The SQI has been developed primarily for the basic education level, with SQI areas and indicators related mainly to this education sector. In addition, the indicators' ranking system is elaborated for use at the primary school level.

However, the overall approach seems easily applicable for use at the secondary education level. Main arguments for this assumption are:

- The SQI is being used effectively in real school practice in developing countries of the South, which provides a strong practice-based tool for wider use.
- The highly participatory development and use of the instruments encompasses an overall approach applicable at every education level.
- The custom-made applicability of the SQI matrix enables a smooth adaptation to the secondary school level.
- Both the SQI guidelines and the instruments are elaborated in a rather simple and concrete way, enabling users to add new items or re-word existing ones.
- Quality research at the secondary education level throughout the world provides a wide range of experiences, concrete indicators, and ranking systems that can be used to adapt the SQI model and its components.
- The same argument goes for the monitoring and evaluation practices being implemented in different countries and regions (as described in the previous sections of this paper).

- The ultimate goal of the SQI implementation, being the custom-made SQAP, yields a model for continuous quality improvement actions at all education levels.

Epilogue

One may argue that all three approaches presented in the previous sections are trying to include the three basic components of the quality concept described in section 2: accessibility, effectiveness, and efficiency. All examples seem to recognize the *complexity* of the quality concept. They also confirm the actual trend to shift from a "small" quality concept, in which quality is primarily seen from a supply side (mainly accessibility), towards a more comprehensive concept that includes the process (efficiency) and the output side (effectiveness). At the same time, each approach differs from the others, according to the different dimensions of evaluation.

Let us analyze these different approaches with respect to three interrelated dimensions of evaluation: (a) comprehensiveness, (b) functionality, and (c) stakeholder participation and ownership.

Comprehensiveness

The most comprehensive approach seems to be the second example: the large-scale evaluation of Dutch secondary education, as described in the section on recent large-scale evaluation in the Netherlands.

The first step in that evaluation (of lower secondary) explicitly includes — even in its phasing — the notion of a broad quality concept: (a) school organizational aspects, (b) teaching-learning process, and (c) pupil performances. Besides, the four basic evaluation questions about the teaching-learning process reflect the same broad concept: inputs and supply, process, impact and output, conditions.

The second step in the Dutch approach (regular school supervision of both the lower and upper levels) adds to the first step ample attention to both aspects of *accountability* mentioned before — that is, accountability to the government and accountability to the consumers. By publishing the results of both the school quality card and the quality report on the Internet, schools are publicly held responsible for the quality of the education they provide.

Functionality

All of the examples described are attempts to contribute to monitoring the quality of education. However, each of the three approaches apparently has a different scope of functionality.

The first example (European project on quality indicators) explicitly aims at *comparing* and *benchmarking* schools in a great variety of countries. The second example (Dutch school evaluation) focuses on *accountability* of schools. The third one (school quality index) focuses on *responsibility of stakeholders* at the school and community level.

Stakeholder participation and ownership

All three approaches give explicit attention to the involvement of stakeholders. Key actors in the education sector are involved in developing criteria and tools, implementing the evaluation itself, and presenting the results. There are also some interesting differences between the three examples.

Given its scope, the European (benchmarking) project mainly involved policy-makers and educational experts. The ownership that came out of this project therefore seems to exist only at that *policy level*.

In the Dutch example, all stakeholders at all levels have been involved. Since the scope of that evaluation was the accountability of schools, the resulting ownership is *formal*, since schools had no choice in participating or not.

The third approach (SQI) seems to realize the highest degree of ownership at the school level. Its scale is small, and all stakeholders are involved in the school itself, participating actively in the whole process — from decision-making on quality criteria to the formulation of quality improvement plans. Besides, participation in the SQI approach is based upon *informal* choices, which often result in *internally motivated ownership*.

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1 See Appendix 4b in "Education: A Basic Human Right. Development Cooperation and Basic Education: Policy, Practice and Implementation." Ministry of Foreign Affairs of the Netherlands. The Hague, January 2000.

2 Parts of this paragraph are taken from: "European Report on the Quality of School Education."

[3] The list is also available on the Internet (http://europa.eu.int/comm/education/indic/membersen.html).

[4] The two progress reports can be found on the Internet (http://europa.eu.int/comm/education/indic/backen.html).

5 In the report, each of the sixteen indicators is presented in sequence, which does not represent an order of priority.

6 Parts of this paragraph are taken from: "Changes in General Secondary Education in the Netherlands" (Pieters and Rameckers), March 1999.

7 Parts of this paragraph are taken from: "The Evaluation of Basic Secondary Education in the Netherlands (1996–1999). Summary of the Evaluation by the Dutch Inspectorate of Education."

8 An English summary of the set of final reports has been published in March 2000: "The Evaluation of Basic Secondary Education in the Netherlands (1996-1999)."

9 Parts of this paragraph are taken from "Evaluation Framework: Regular School Supervision Secondary Education. Version 2.2. 2001–2002.

10 Parts of this paragraph are taken from *School Quality Index (SQI) Guide*. In: *PLAN International. Corporate Planning, Monitoring and Evaluation Manual* (CPME: Baseline Technical Guidelines; version 6/98).

11 PLAN International is an international humanitarian, child-focused development organization. It supports development interventions in five domains: community health, basic education, habitat, livelihood, and building relationships between the developing and developed world. The programs at present cover 43 countries and benefit over 9 million children in Africa, Asia, and Latin America. PLAN's international headquarters are in the United Kingdom. One of the core programs of PLAN is education, which in many countries includes early childhood care and development (ECCD), formal and non-formal primary education, secondary education, and adult literacy. PLAN's main concern in primary education is improving the quality in terms of children's participation and achievement. In most countries, PLAN implements the programs through local communities directly. In a few countries, PLAN works with local NGOs. PLAN spends 25 to 27 percent of its income globally on various educational interventions, which range from classroom construction to capacity building of parents and communities.

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ANNEX

SQI Indicator Matrix

INDICATORS	SCORE				
	1	2	3	4	5
A. School organization and support					
1. The school has a plan to improve its facilities and services, which involves administrator(s), teachers, parents, students, local authorities, and shows their responsibilities					
2. There are norms of operation/conduct, known by heads, teachers, students, and parents					
3. The administrator (if any) provides instructional leadership and support to teachers					
4. The teachers work in cooperation, as a team, and help each other					
5. There are student organizations such as student government, student commissions, or clubs.					
6. There is a school-community committee that supports school activities.					
7. Teachers participate in at least one in-service training workshop per year					
8. The teachers are at the school five days per week					
9. Classes start and end on time every day					
Sub-total for organization					
B. Physical conditions and environment					
1. Classrooms are large and comfortable enough (not too warm/cold, sufficiently ventilated).					
2. The classrooms are clean and the walls have posters, maps, and pictures.					
3. The school grounds are clean, and there are no dangers for the children.					
4. There is enough space for play and recreation at the school.					
5. There are enough clean and working latrines or toilets.					
6. There is a working, drinking water system at the school.					
7. Every classroom has at least one good blackboard					
8. There is a desk, or bench/chair space for every child.					
9. The classroom furniture can be arranged so that children work in groups					
10. School facilities are maintained/repaired (no broken windows or furniture, licking roofs).					
Sub-total for physical conditions/environment					
C. Children's well-being	1 2 3 4 5				
1. The school has a health program (including a daily snack, children's growth monitoring, and dental hygiene					
2. The children have play and recreation activities during recess periods.					
3. Teachers participate in play and recreation activities with children					
4. Children are treated well at school.					
5. Teachers dialogue with children showing respect for them.					
6. Children respect their teachers.					
7. The school promotes the rights of children (children learn their rights, posters/pamphlets available)					
8. The school promotes education for parents of school children.					
Sub-total for children well-being					
D. Classroom activities					
1. The teacher(s) use teaching or lesson guides.					
2. Teachers combine lecturing with work in groups and individual work.					
3. Teachers motivate children to take initiative, ask questions, work on projects, seek information, explore their surroundings, and use reasoning.					
4. When children work independently or in groups teachers facilitate their work and/or help children who need guidance					
5. The classrooms have textbooks, work books and activity guides that children can use to work individually or in groups					
6. The school has a library with books that children can read					
7. Teachers use materials that the school provides and/or make their own materials using local resources.					
8. The class time is used mainly for teaching/learning activities.					
Sub-total for classroom activities					
TOTAL FOR SECTIONS A to D					
E. School/student performance (tested at grades 3rd or 4th and 6th or 7th, depending on country)					
1. Children read with comprehension.					
2. Children can use writing to communicate.					
3. Children can perform four basic mathematics calculations (adding, subtracting, multiplying, dividing) and resolve simple problems					

Criteria for ranking of indicators on 1 to 5 scale for sections A to D:

1 = None/never/total lack
2 = Very little/almost never/few
3 = Some/sometimes/about half
4 = Sufficient/most of the time/nearly all
5 = Plenty/always/all

Criteria for ranking indicators in section E:

Reading, writing, and mathematics performance criteria for section E are elaborated as an annex to the PLAN SQI guidelines. These are suggested criteria based on standards for primary education. Tests to measure reading, writing, and mathematics skills can be based on these criteria.

The ranking of indicators for section E should be based on measured performance, as shown by average test scores. The average test scores for grades 3 or 4, and 6 or 7 would be used. The following cut-off levels are suggested for indicator scores.
85% or more (> 85 points out of 100) = 5
75% or more (> 75 points out of 100) = 4
65% or more (> 65 points out of 100) = 3
55% or more (> 55 points out of 100) = 2
below 55 % (< 55 points out of 100) = 1

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Secondary education systems in Sub-Saharan Africa (SSA) are ill-equipped to meet the rapidly increasing demand generated by the Education for All effort, and to respond to the need for skilled labor required for SSA to integrate successfully into the modern, knowledge-based global economy. To address this, most countries will need to expand very enrollments in secondary education. More importantly, they will need to radically improve the quality and relevance of education programs, drawing on the significant innovations that have taken place in secondary education over the past decade throughout the world.

To facilitate knowledge exchange on options for reforming secondary education in SSA, a joint World Bank-UNESCO/BREDA workshop was organized December 3-6, 2001 in Mauritius. The workshop brought together high-level representatives from over twenty-five African countries. The present report contains presentations made at this workshop by the team working on a major regional World Bank study on "Secondary Education in Africa" (SEIA). The presentations focus on recent reforms and developments in specific areas of secondary education, and make recommendations for improving the performance of the sub-sector.

Chapter 1 summarizes the workshop's objectives and issues discussed by the participants. Chapter 2 presents the SEIA study. Seven themes are discussed, and specific terms of reference are presented. The chapter highlights the importance of increasing access to secondary education and renewing the curricula to meet new societal and economic demands. It proposes cooperative partnerships with Sub-Saharan countries to undertake the SEIA work. Chapter 3 presents an overview of political and management aspects of the South Korean expansion of secondary education over the last three decades and its lessons. Chapter 4 discusses the renewal of secondary education curricula and assessment in South Africa, and emphasizes the importance of clear and agreed attainment targets. It argues for improved "continuous assessment" in the international context and explains the challenges caused by HIV/AIDS and various international factors. Chapter 5 discusses recent reforms in science, mathematics, and information and communication technology (ICT) in basic and secondary education in the Netherlands and presents some of the arguments for these changes related to a competitive international market place. The role of ICT in school administration and its function as learning and teaching tools are also discussed. Finally, Chapter 6 presents experiences from European inspectorates for "Effective Monitoring of the Quality of Education" in the context of effective secondary schools, and the use of a common quality criteria framework.

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